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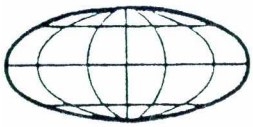


THIRD INTERNATIONAL CONFERENCE *OF* WOMEN ENGINEERS AND SCIENTISTS

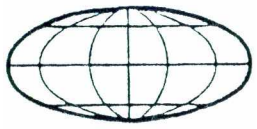
W E S

WOMEN'S PROFESSIONAL AND FAMILY DUTIES

SOCIOLOGICAL PAPERS

Turin, 5 - 12 September 1971

1971



W E S

PROCEEDINGS OF THE

THIRD INTERNATIONAL CONFERENCE OF WOMEN ENGINEERS AND SCIENTISTS

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1971

W E S

INTERNATIONAL CONFERENCE OF WOMEN ENGINEERS AND SCIENTISTS

5 – 12 September 1971

PLANNING FOR PROGRESS

			21, 00
5 Sunday	Registration at Conference Headquarters, Via Sacchi 8	visit to royal palace and Armory. Piazza Castello	Greeting's Ceremony At Ulysse's Restaurant. C.so Unità d Italia 125
			21, 30
6 Monday	Opening Ceremony at PALAZZO MADAMA Piazza Castello	Technical Session A Energy Sources	Concert at TEATRO CARIGNANO Piazza Carignano
			18, 30
7 Tuesday	Technical Session B Communication And Transportation.	Technical Session C Computers Technology.	Reception Offered by Engineers And Architects.
		13, 00	21, 00
8 Wednesday	Technical Session D Housing, Town and Community Planning.	Visits to industrial plants and pieces of art in Piedment.	Showing of films and documentaries produced By Delegates.
			21,00
9 Thursday	Technical Session E Industrial production. Technical Session F Human Engineering.	Sociological Session A Problems of aptitudes or of tradition Sociological Session B How to intergrate alternatives.	Intern. Meeting of Representatives to plan the Fouth Intern. Conference.
10 Friday	Visit to FIAT	Sociological Session C Evolution of Women's role Sociological Session D, Equal Opportunities: deserved or gift?	BANQUET
11 Saturday	Visit to: H) Venaus hydroelectric plant of ENEL and to Moncenisio lake. Visit to: R) The prefabricated Residential Center.		
12 Sunday	Departure for the post-Conference Tour or for return to home.		

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UNIVERSITY STUDENTS ATTRACT HIGH SCHOOL STUDENTS INTO ENGINEERING

By: Spidola Krumins, Teri Mangerio,
Pamela A., Roupe and Mary Alice Blenx

Biographies

Mrs. P. Roupe, 24 years old, a native of Toledo, Ohio, attended Kent State University and Pratt Institute, Brooklyn, New York, for architecture. She transferred to Newark College of Engineering and graduated in civil engineering in June, 1971.

Miss T. Mangerio, born in Newark, New Jersey, a graduate of Essex County Girls' Vocational and Technical High School, attended Newark College of Engineering and graduated in chemical engineering in June, 1971.

Miss S. Krumins, born in Hamburg, Germany, a graduate of Battin High School, Elizabeth, New Jersey, is currently attending Newark College of Engineering as a senior student in chemical engineering.

Miss M. Blenx, born in Morristown, a graduate of Columbia High School, is currently attending Newark College of Engineering as a' sophomore student in chemical engineering.

All three women have been active in technical, professional and honor societies and have also visited local high schools to demonstrate the advantages of an engineering education for women.

Summary

This paper discusses the most effective ways of attracting women into the engineering profession. These ways include personal contacts, recruiting days, speaking with guidance counselors, contacting local newspapers, and pointing out the advantages of the engineering education to parents. Efforts in this area have produced a significant increase in getting girls into engineering.

UNIVERSITY STUDENTS ATTRACT HIGH SCHOOL STUDENTS

INTO ENGINEERING

By: Spidola Krumins, Teri Mangerio,
Pamela A. Roupe and Mary Alice Blenx

There exists a problem in the United States to the effect that women must be made aware that engineering is a suitable career opportunity. The Society of Women Engineers has been concentrating its efforts to attract Junior and Senior high school students into engineering. The Newark College of Engineering Chapter of Society of Women Engineers feels that University students can make an important contribution in this area. Younger students relate better to college students than to educators and administrators. College students can recall their own doubts and feelings concerning their future careers and therefore are more equipped to answer young students' questions. Susan Lefcourt comments:

> "Student members of college engineering organizations would make an especially strong impression..., because they are closer in age and more directly involved than professors and administrators."

The N.C.E. Chapter has been experimenting in methods to interest women in engineering. Present methods that have produced favorable results include: personal contacts with individual students, contacts with guidance counselors and educators, informal gatherings for parents, and contacts with local newspapers.

The most favorable has been personal contacts with individual students. Many women students at Newark College of Engineering have been contacting and speaking to high school students in various parts of the State of New Jersey. Letters were mailed to all New Jersey high school math and science educators and guidance counselors. Replies were followed by a personal appearance of one or more University women students. Many of the high school girls responded positively and requested further information concerning science and engineering as a career.

*Chemical Engineering, November 3, 1969, page 98; Author, Susan Lefcourt.

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Student reactions seem to substantiate that small groups tend to work better. Question and answer periods concerning personal work and class experience and prepared literature produce good responses.

Inter disciplinary curricula are presented along with those of pure engineering so that a wider area of career opportunities are presented.

Pointing out the advantages of an engineering education for women to high school guidance counselors is another major area that women at N.C.E. have investigated. By encouraging guidance counselors, they are, in turn; encouraging high school students into engineering and related disciplines.

A few informal gatherings directed toward parents have been most helpful in reassuring that engineering is a career possibility for females. At student nights, parents, relative's, and friends of engineering college students have learned of the experiences and advances of women engaged in technical areas. .

Local newspapers have done an excellent job of making the general public aware of women's achievements in technical. Areas Public awareness is beneficial in creating acceptance that engineering and science are not unusual careers for... Females.

Through investigation, the Chapter has developed further ideas which should produce favorable results. To date, these have not been undertaken; however, results from previous' methods indicate that these ideas should work. One such idea is a Recruiting Day. Brooklyn Polytechnic Institute, Brooklyn, New York, and Stevens Institute of Technology, Hoboken, New Jersey, have held Recruiting Days for women and the results were good. At the writing of this paper, a Recruiting Day is planned. This day will include discussions concerning general admission requirements, specific information about various engineering curricula by both faculty and students, informal discussion or question and answer periods (dependent on group size), and guided tours of the college.

Before sponsorship of a Recruiting Day, the directors of admission of engineering schools should visit girls in high schools. This directed attention to girls will stimulate their interest in engineering. By following the high school visitations with the Recruiting Day, the girls' interest will be intensified. .

In addition to the Recruiting, Day the college student organizations should sponsor industrial plant and 60nstruction trips for high school students. This would give these young adults a better insight into an engineer' s job.

The direct influence parents have on their children should not be overlooked. Use can be made of this influence. To do this, direct contact should be made with the parents and adult groups. Such groups as Parent Teachers Associations, Chamber of Commerce groups, and other organizations should be contacted by the women students to plan possible speaking engagements.

Educators can also be used to inform adults and students by means of their everyday contact with such groups. Educators can be reached through their various conventions and publications.

It. has been found that person-to-person contacts either by telephone or in person are more effective than letters. This concept could be expanded to include a telephone campaign.

More and more women are entering engineering and science careers and doing well. We know that this is a new beginning for us and for all women so that they might find a challenging and enjoyable future for themselves and their families.

S D 5

THE CAREER OF WOMEN ENGINEERS AND SCIENTISTS IN THE FEDERAL REPUBLIC OF GERMANY

by Renate Musso

Biography

The author is an architecture graduate of Hanover Technical University. After graduation she worked in several architects, offices. She completed a subsequent training period in the senior engineering service by taking the 2nd State Examination. She then took up work with the campus planning office for Cologne University. After some years she left Cologne and has been heading the section "Rationalization in University and School Construction" within the Federal Ministry for Education and Science since May 1970.

In addition to her full-time duties she worked up to 1969 as a correspondent for the "Central Archives for Campus Planning" reporting on the United States and Canada. Since 1966 she has been a member of the "Society for College and University Planning".

In several publications she reported on her work at Cologne University and for the "Central Archives for Campus Planning;. Stuttgart. Furthermore she participated - with some success - in a number of architect' s competitions in the field of school and university construction as well as town planning.

Summary

In the Federal Republic of Germany 37% of all employees are women. Their representation in top positions, both in science and in administration and industry is still insignificant, indeed.

The public must be made more conscious of the fact - not only on the part of women - that equal chances for promotion and leadership can only exist, when women are relieved by way of a revised sharing of family duties, and a stronger interest on the part of the public. Equality of opportunity has become incentive for action in the field of social policy and, in particular, in that of educational policy.

THE CAREER OF WOMEN ENGINEERS AND SCIENTISTS IN THE FEDERAL REPUBLIC OF GERMANY

By Renate Musso

Considering that in the Federa1 Republic 37%of all employees are women, their representation in top positions, both in administration and in science and industry, is insignificant, indeed. Whereas men are promoted when striving for an increased influence, for a higher income and prestige, women are far away from enjoying equal opportunities given when they have an excellent university background.

Mrs. Hamm-Dracher, State Secretary in the Federal Ministry for Education and Science, made the following comment on this subject in a paper she delivered on. "Education in the Age of Technology": "In a world which continues to be overwhelmingly dominated by masculine ideas of domination, we still find ourselves at the very beginning of cooperation and responsibility on a basis of equality. In all sectors of public, economic and working life, we are still more or less far away from the aim of a fair partnership - usually it is more, not less. Mostly unaided, every one of us women is striving, wherever she stands, for more just, peaceful and humane principles to govern life in the community".

Then dealing with the subject of career of women engineers and scientists in the Federa1 Republic of Germany, one is surprised to, find how few statistics and exact data are available. On the one hand, the available material is broken down by "occupations". The inquiries carried out under this heading proceed as if there were no such things as socially founded or socially relevant differences of sex and as if equal advancement opportunities were either not desirable or had already been realized. On the other hand, other statistical data are grouped under the heading of "sex". These surveys are again not very revealing, because very heterogeneous occupational groups with different training backgrounds are comprised under the concepts of "senior civil service grades" and university graduates".

In the following I shall try and compile the available data which throw light on the advanced prospects of women engineers and scientists.

I should first like to talk about “women in leading positions in the Federal Administration” as “pars pro toto”, because here the advancement of Women can be traced more clearly, although this statistical survey does not only cover women engineers and scientists but also female graduates in law and economics. The regulations on educational background, examinations and careers in Public Administration do not make a distinction between men and women. The situation on the labour market has improved employment opportunities for women. In principle, they can also be promoted. However, the regulations governing promotion require a certain number of years in employment for the applicant for top position. In the case of shorter periods of employment - often due to the conflict between a job and family ties - opportunities are reduced automatically.

The survey entitled “Women in the senior civil service grades of the Federal Administration” shows that out of a total of 5.300 employees, 5, 5% were women.

Since "leading positions" in the Federal Administration start with the rank of a head of section, the statistics differentiate between the mode of employment and the rank in the hieraruchy.

According to this inquiry, out of *5.000* persons employed in the technical sections, 4, 8% were women. Altogether there were 1.830 heads of sections. Among them there were 3, 5% women - as many as 30% of these women were in the foreign service of the German Foreign Office. Out of a total of 3.000 assistant heads of section approximi1tely 8% are Women.

Among 217 deputy heads of department none was a woman; among 234 heads of department one was a woman. meanwhi1e, a woman has been appointed Permanent State Secretary (in the Federal ministry for Education and Science). She is a scientist.

The lowest rank is that of a "Regicrungsrat" with 7% of women, next higher is that of "Oberregierungsrat" with 4, 7% Then comes the rank of "Regierungsdirektor" which is held by 4% of women, the highest rank being that of a "Ministerialrat" with 2% of women. The higher the position, the less women represented.

It may be interesting now to have a look at Parliament. In the 6th German Bundestag only 6, 6% of its r0mbers are a woman that is the lowest percentage ever since the foundation of the Federal Republic. Grouping the 34 female Members of the Bundestag according to their occupations, we obtain the following picture:

12 housewives
6 teachers
4 senior employees
3 women from the senior civil service
3 welfare workers
2 editresses

Hardly any woman in politics has been a woman engineer or woman scientist, as far as the last few years are concerned. This seems to me a regrettable fact, because despite this under-representation of women in the membership of Parliament, there has been no German Bundestag in the post-war period where so many women were assigned so vast responsibilities in the Federal Government.

Chancellor Brandt appointed one woman Minister and two women Parliamentary State Secretaries. In addition, the office of Vice-President of the German Bundestag is held by a woman; so is that of the executive secretary of the parliamentary group of the Social Democratic Party.

Now, what is the percentage of the female scientific staff at universities and teachers training colleges?

In 1969, 7, 6 % of the scientific staff at universities were women, among them only 1, 7 % held a chair. At teachers training colleges, the female academic staff amounted to 19, 3%, and 9% of whom were professors. In this context it may be interesting to mention that in teachers training colleges male students accounted for only 33% (19.777) as against approx. 66% (39.934) of female students. These percentages are in inverse proportion to the number of women holding a chair.

As far as industry is concerned, the situation is a similar one. The consultant engineer Zauber has carried out a survey on the basis of data available from secondary statistics of 1.500 firms, which were asked how many women held top positions. J .Zauber hi1s found that only 0.3% of women are employed at the executive level where the annual income is 80.000,-DM.

Out of 5.000 positions at the executive level in absolute terms, only 16 positions were held by women. As has been established, there is only one single woman who sits on an executive board.

According to inquiries carried out by the Association of German Engineers (VDI) 8% of all engineers in the Federal Republic are women. In the Soviet Union, however, the number of women among the technicians and engineers amounts to as much as forty percent of the total.

It is true; the percentage of female students at Technical Universities increased from 1, 4%in the winter semester 1963 to 2, 8%in the winter semester 1970, but this is still far away from being a "breakthrough". In 1970 the Association of German Engineers compared statistics on its female members holding a diploma or other academic degree with an inquiry on "The activities and income of engineers" (1968). In comparison to 19% of the men, 50% of the women are employed in positions at the lower end of the ladder, whereas not one woman (as against 12% of male engineers) advanced to the position of director or executive secretary. Women engineers are still excluded from employment in many fields and positions. It seems to me that they are mostly employed in positions which leave little room for creative work, i.e. in documentation centres, libraries and laboratories.

Why is it that women are underrepresented in the manner outlined above? An important reason for the specific problems and the socially relevant disparities is certainly to be found in the educational system. Good schooling and a sound vocational training have so far not been considered to be of the same importance where women are concerned. The percentage of women among abitur candidates was 37% (in 1965), among students 26%.

If they shun technology and natural sciences, this is not because of any natural defect of their intellectual makeup, but because the prevailing stereotype prevents the actualisation of the existing potential. Thus the reluctance of girls to engage in a scientific or technical profession results from the so called female role as it is viewed by society. Already the little girl is kept away from' the occupation with technical toys. This tendency continues in the mi nor weight which is allotted to natural sciences courses in girl’s schools. This results in a poorer qualification for girls in this field and on no equal strong conditions for their universities studies.

If, in spite of these poor starting conditions, a girl chooses an engineering profession, she will encounter further difficulties. On the one hand, opportunities of working part-time have so far hardly been offered or made. Use of and, on the other hand, gaps in knowledge come especially to bear in the engineering professions. These gaps are caused by rapid going-out-of-date of technical knowledge, so that it is very difficult for a woman engineer to continue her career after a major pause. To sum up, there is a striking discrepancy between the legal equality of women and their equality in working life.

A woman's work in a job can only be a path to public life and into political commitment, if it is combined with responsibility.

In this connection, the sociologist Helge Pross says: The majority of male population approves of the fact that women go out to work only to the extent that it leads women into modest positions, “that it does not detract their attention from their responsibilities in the family, which are the only important ones for them, and that they are kept out of politics". .

This attitude is clearly reflected in the fact that women are excluded from middle and top management posts in the working world and in politics. This prevents them from developing qualities of leadership.

The "Women's Inquiry" of the Federal Government held the following to say in this context: "Even when women have an excellent educational background, they are often used only in positions with limited terms of reference which offer little chance in promotion. The reason is that a woman is not expected to stay very long in the job because of a possible marriage. Therefore it seems to be unprofitable to spend time and money in extensive job training and in the gathering of experience".

Those who have been dealing with women's problems for quite some time feel that the progress of women has been too slow. Peverthe1ess, the Federal Republics, like many other countries, ht\s experienced a change in society during the last few years, even though somewhat sublimina1. This change is, for instance, reflected by the recognition that it is necessary to relieve women from the burden of being the only one to care for the family. The heated discussions which have taken place recently on the planned reform of divorce legislation have revealed that women tend to have lifelong employment just as men do.

The aim of the social and educational efforts in the Federal Republic is to fully and consciously exploit the framework, which the legislator has set with regard to equality. Prejudice and discrimination must be abolished in the same way as the outdated role 2ttributed to women, and traditional attitudes connected with it. Besides equal chances in education other measures are important to ease the employment and reemployment of women:

- Vocational training,
- More part-time jobs, for men and women,
- More Kindergartens and day-schools.

The postulate that women must be adequately represented even in leading positions can only be realized, I think, by applying new and unprecedented methods. In this connection, one measure may be of special interest, which has already opened up good opportunities to other groups of underprivileged. What I am thinking of is a provision to the effect that a certain percentage of all positions, e.g. in the civil service, must be filled by women (similar to the provision of having a certain percentage of war-disabled persons in public administration).

It must be brought home to the general public, more that it has been done so far - not only on the part of women - that equal chances for promotion and leadership can only exist when women are relieved by way of a revised sharing of family duties and a' stronger interest on the part of the public. .

Equality of opportunity has become the incentive for action in the field of social policy and, in particular, in that of educational policy.

S B 1

THE PROBLEM OF PART-TIME WORKING IN THE FIELD OF ENGINEERING

Biographie

Frau Dipl. Ing. Berger is a test engineer in the chemical engineering department of the Badische Anilin- & Sodafabrik, Ludwigshafen, Germany. After matriculation in 1943, employed as a technical arithmetician in the aircraft industry. 1945 elementary school teacher. 1949 trained at the Musikpadagogische Fachschule, Erfurt. 1952 - 1957 studied at the Technische Hochschule, Dresden - subjects mechanical engineering and engineering teaching. Employed in industry since 1958.

Brief Summary

The Association of German Engineers (VDI) is engaged in trying to attract girls into the engineering profession, and in breaking down prejudices. The VDI committee on ‘ Women in the Engineering Profession’ is working out recommendations on the best method of combining the duties of the professional woman with those of the family woman. The basis of their present discussions is part-time employment. Representatives of the Federal German Labour Ministry, industry and trades unions are working together on this subject. The 'Mirdal-Klein' three-phase theory is too inadequate for technical profession application. In view of the rapid advances made in industry and the natural sciences, a break of 10 to 15 years would appear to present too many problems. Part-time work would be a good way of bridging the second phase and of keeping abreast of technical developments. According to the statistics, there is a general growing interest in part-time work, and enough positions are available in the 'typical female professions'. However, the pertinent requirements for the technical professions are less favourable for the female, and development in this respect is hampered by prejudices. Only under boom conditions has part-time working any chance of success, as employers would then also try to offer suitable working conditions to women in industry. An experiment is under way: a large industrial concern is to cooperate with local school authorities to find practical ways of combining part-time working with all day schooling.

THE PIWDLEH OF PAHT-TIME WOHKING IN THE FIELD OF ENGINEEHING

R. Berger

(1) Introduction - The Task of Committee "Frauen im Ingenieurberuf" (Engineering Careers for Women).

In spite of the present under employment "conditions for engineers at the present time in such countries as the United states, the number of scientists and technicians required in the coming years will increase alarmingly. This applies to the old industrial nations and even to a higher degree to the young nations still facing industrialization.

A far-sighted policy of education must, therefore, endeavour to mobilize all unused talent reserves, i.e., also the mental potential of women interested in natural s9ience. The "Verein Deutsoher Ingenieure" (VDI) (Association of German Engineers) recognized this necessity already years ago and makes efforts to win young women for engineering careers and to remove prejudices. In the Federal Republic of Germany an engineer's job is at present unattractive to our younger women. The number of female students of technical colleges actually amounts to approximately 3 percent.

Since 1966 the VDI has a Committee "Frauen im Ingenieurberuf" include ding the same percentage of male and female members. This committee prepared among other things suggestions for a reasonable combination of professional and family duties. Just for engineering jobs that are generally carried out in industry, special problems are involved.

The Mirdal-Klein sociological model served as the first three phase theory in this field. It envisages that the young woman acquires a solid professional training and has some years of experience until the first child is born (1^{st} phase), In the subsequent second phase she retires for some years, and after the children are partly or completely outgrown from their mother's care she can practise again a profession {3^{rd} phase).

Based upon this model the Committee prepared a leaflet "Reentering professional life" which shall ease the start of the female engineer into 3^{rd} phase. This leaflet was submitted on occasion of the 2^{nd} International Congress of Women Engineers and Scientists in Cambridge in 1967.

(2) Does the Three-Phase Theory Make Sense in Technical Jobs?

When regarding the situation critically, however, the question arises whether the three-phase theory is applicable to technical professions. By the rapid technical development, the knowledge acquired by training quickly becomes outmoded so that even the

Engineer who practises his profession must steadily apply himself to continuous on-the-job education. This applies to a minor degree also to technical jobs of middle--levels. When a woman interrupts her career, she fails to gain not only the experience from her job, but also tile opportunity to be continuously educated with the extensive instruction programs of large concern and scientific association (e.g. VDI).

Furthermore, there is a trend in industry to prefer younger personnel this tendency, in connection with the long-standing prejudice against women in technical careers, reduces the chances of a 40-year old female engineer *to* get an adequate job to a minimum. we believe, therefore, that an interruption of 10 to 15 years is intolerable for technical careers. Part-time work seems, therefore, to be a good possibility to reduce the second phase or to bridge it completely. Thereby the difficulties in adoption which necessarily occur after a longer interruption are avoided' and the technical knowledge pt up to date.

(3) Combination of Professional and Family Duties Comparison with Other Professions

It is not a mere coincidence that the major portion of young women who passed the secondary school examinations, approximately equivalent to two years of university study in the United states, want to become teachers. This profession has the appeal of a part-time job because only part of the professional duties is fulfilled away from home. A teacher's home life problem of rearing her child exists only for a few years because by the beginning of kindergarten the child and mother have achieved the *some* daily rhythm. A reduced working time can be realized best of all in the free-lance professionst e.g., medicine and law, because they offer an advantage insofar as living and Job are made in the same house and the working time can be adapted to a cartain extent to the family rhythm.

All this advantages do not exist for technical jobs because they are practised nearly exclusively in the industry. This means however, a strict working time dependent on the production rhythm and a longer way to workplace. Personal special arrangement becomes more problematic the larger the firm is. Thus the conditions for a part-time work are essentially less favourable for technical jobs. Furthermore there are emotional barriers rooted in historical development. From the very beginning. The industrial world of work was a typical male one where a male style of conduct developed and set up a standard.

(4) Situation on the Labour Market for Part-Time Personnel in Germany

In technical jobs part-time work does not represent the normal work term. Only during booms, under the pressure, of the labour

Market, will it have a chance. Actually this situation prevails in the Federal republic of Germany. As a result, labour from less industrialized countries is employed in the Federal Republic of Germany; it is, however, impossible to meet the requirements of qualified technical expert personnel from this source. We think of engineers, technicians, draftsmen, laboratory and electrical assistants, and programmers. with respect to these middle-level professions, however, there is a dive requirement that will even increase in the coming years when a great number of these people become engineers of a higher training level based upon the new college legislation.

For these middle-level jobs, large enterprises in the chemical and electrical industry have created their own training centers where they have invested substantial funds. Fortunately, the young women participate vigorously in these training possibilities. Therefore, it is seen that through these professions women have had access to the world of technology which was hitherto mostly concealed from because of educational bounds and social prejudices.

Unfortunately this development does not stand the economic test. Since the time span between the end of professional training and marriage is shrinking more and more, the training of women proves as misdirected investment if the job is only practised for a few years and is not revived. The resumption of professional practice is not at all foreseen in the model of life of a woman, but it 1s rather casual. If there was an offer of part-time work, such women could be kept interested in their jobs. It can be recommended to the enterpriser to think over how be can reactivate these lost training investments.

The labour market' shows that there are indeed reserves within the scope defined above which should be used. From statistics kept on part-time workers by the Bundesanstalt fur Arbeit (Federal Institution of Labour), the following information resulted on the technically orientated professional groups in 1970: The number of vacancies varied between 1,500 and 3,500. The number of unemployed looking or a job varied between 8,000 and 12,000. Thus there are indeed approximately 4 times 8S much unemployed as vacancies. Such R. relation is unique on the labour market of the Federal Republic of Germany.

(5) Problems from the Enterpriser's View

The difficulties which result from setting up jobs for part-time work should not at all be understated. On the other side they should not be loaded with emotional ballast which could be avoided. Solutions that satisfy all people concerned can be found only without prejudices. This requires that men change their thoughts and accept a woman as a qualified expert, recognizing her equally, also for leading positions.

Some problems should be briefly mentioned. Since investments f*or* a job are nowadays very high (machinery, instrumentation social institutions) it should not be filled only for a few hours. Due to the interrelations among the different departments of an, industrial enterprise a certain time of presence cannot be avoided in mast cases. For such reasons a subsequent part-time worker who takes over has to be found. This, however, meets with difficulties in the event that mothers of children are concerned, Also sociological and psychological aspects are mentioned, It is felt to be, a disturbance of the group harmony and therewith the efficiency of a group if one or more members of the group are interchanged during the daily working time.

A further handicap is the confinement of such personnel to the husband's residence, It is not possible to transfer them simply whenever the management so requires, On the other hand part-time workers themselves want to see working and commuting times in a sound relation, The traffic conditions. Except in large pities; are unsatisfactory for part-time personnel. Therefore, these women often refrain from using their professional qualifications and, work rather as unskilled workers in the vicinity of their res1denoes, This attitude, however, cannot be in the interest of economy because valuable technical knowledge is wasted, .

In booms women with family duties do not have the possibility to work overtime, Also their capacity for continuous education in their tree time is limited. On the other side the employer has the advantage that he need not take the risk of fatique. From work' studies it is seen that a reduced working time results in higher efficiency, Also visits to public authorities, doctors and corresponding commuting times are included in the working time of full-time employees, In the case of part-time work the employer denies such people's free time,

Higher qualified personnel, e.g. engineers, are told that their activities cannot split up to part-time work. In staff positions a reduction of the working scope and therew1ththe load 1s absolutely possible if there is a good will. Leading position. However include control or supervision. This need not be an insurmountable handicap, Thanks to her better empathy, a woman succeeds better inrnot1vating her collaboratora. This format leadership is aimed at in modern personnel policy. Thereby, the steady control function looses some of its importance.

From the sociologic point of view the workers' world can be harmonized by integrating female expert personnel into the field of technique, and some technocratio decisions that are today still exclusively made by men would probably have a more humanitarian character.

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The releasing moment will always be the situation on the labour market, In actual discussion, the economic experts of the Federal Republic of Germany agree insofar as additional national labour can be made available only from the ranks of women.

(6) Proposals to Solve the Problems

The development of the concerned women's attitude towards professional activity depends first on the public attitude towards such activities in general and especially in technique, and second on the offer of attractive jobs. The change in conviction which is necessary for this purpose cannot be demanded from men alone. Actually only an alarmingly low number of women are represented in the decisive committees of economic experts. It seems, therefore, imperative that the female technical. Intelligence becomes a yare of social and professional 4uties and that it is ready to take also responsibilities in the technical development and its sociologic consequences. Practical proposals for establishing jobs for part-time work can only be prepared by men and women in common.

Thus, exact work studies and analyses are required in the technical scope in order to enlarge the possibilities for creating part-time jobs

To avoid organizational problems in the filling of part-time jobs linked with machinery, it is recommended to make much more use of part-time in form of full-time work on some days of the week,

For estimating which circumstances can be considered as realistic in the long run, it is worth making a comparison with other countries. In the socialist countries, the questions dealt with are not longer problems. Out of the western world, Sweden can serve as a model, While in the Federal Republic of .Germany 25.3 per cent of women participate in professional life, Sweden has female employment rat& of 37.0 per cent. In the Federal Republic of Germany women work more than 43 hours on an average. In Sweden wives who want to work find "ideal" conditions, for example they on the average work for only 29 hours, whereas unmarried women work for 38 hours, These favourable conditions in Sweden are the result of a planned promotion on the part of the state.

In the Federal Republic of Germany, there become necessary some changes of the labour and tax legislation in order to remove the discrimination of the female worker in general, and of the female part-time worker especially, The most social legislation, however, cannot change anything unless the woman herself is ready to take an active part in social tasks, and feel also responsible for technical development.

This appeal is made also to the male engineers. The VDI has recognized. That engineer must contribute more and more to the decision of sociological progresses. Approximately one year ago a sociological committee was founded to extend the activities of the association beyond merely professional work.

Since the German female engineers are aware of their sociological co responsibility they have set themselves some concrete tasks:

(1) A, group of 6cholarly trained female engineers elaborates lectures for professional instruction. Such lessons with the stress on technical jobs given for men and women in common shall be introduced in the terminal classes of all schools teaching general knowledge as recommended by the VDI.

(2) Since the full-day school is not yet realized in the Federal Republic of Germany and only an insufficient number of Kindergarten and day-nurseries are available, the following experiment is being prepared: The personnel department of a large industrial enterprise cooperates with the local school board in order to set up a model for winning part-time workers in technical jobs. The children of the part-time workers are gathered in a school near the factory where they are served a meal in the existent canteens and are supervised thereafter when they are doing their homework's. By this method working times could be realized which amount to about 75 per cent of the normal working time. There is no doubt about that this proposal is far more attractive for the enterpriser than employing the discriminated "half-time worker".

The German female engineers' feel co-responsible to articulate the problems of the female middle-level workers, because this the way to arouse the women's interest in technical jobs. Furthermore once engineers they will recognize - independent of their sex - that engineering work is only feasible if sufficiently qualified personnel of the technical middle-level is available. .

UN EXEMPLE DE NORMALISATION DE TERMINOLOGIE SCIENTIFIQUE ET TECHNIQUE:

LE VOCABULAIRE ELECTROTECHNIQUE INTERNATIONAL

Par erne hamburger, ing.dipl., dr és sc.techn., prof. á l' EPF-Lausanne (Suisse).

Biographie: nationalité Suisse,bourgeoise de Borex(vaud).Née á Bruxelles Ixelles en 1911; écoles primaries et secondaires en Belgique,Allemagne et Suisse. Maturité fédérale au Gymnase cantonal á Lausanne. Ecole polytechnique de l' Université de Lansanne(EPUL) devenue depuis Ecole polytechnique fédérale de lansanne (EPF-l): diplôme d' ingénieur-électricien(1933) et doctorat (1937). Ingénieur d' etude á la section des recherches industrielles de l' institute de physique de l' EPF-Zürich(1938-42), au department raio-grammo de paillard S.A. á ste.croix et yverdon (1942-52) á l' EPUL resp. EPF-L chef de travaux (1952-57), professeur extraordinaire (1957-67),professeur ordinaire depuis 1967: chaire d' électrométrie.

Member du comité électrotechnique Suisse, 4e vice-présidente de la federation internationale des femmes diplômées des universities, senior member IEEE.

Résumé: le laps de temps qui s' écoule entre une découverte ou une invention et son exploitation industrielle deviant de plus en plus court. Or chaque découverte fait intervener des notions nouvelles, qu' il faut decrier, faire comprendre aux nn-spécialistes, et auxquelles on donne des noms plus ou moins bien choisis. Lorsque des découvertes différentes se font Presque simultanément dans des pays différents ou deux noms différents á un meme phénoméne. Mais les échanges entre les peoples vont en s' intensifiant et il est de toute premiére importance qu' on se comprenne. Or, les differences de langue c-achent souvent des differences de conception: li faut alors recourir á des definitions précises de la notion en jeu et ensuite leur donner un nom, et un seul dans cheque langues. Au moment des échanges commeriaux intenses entre pays de langues diverses,alors que la mise en service d' un dispositif important, larsque les instructions sont mal comprises, peut mettre en danger des vies humaines ou peut entrainer une catastrophe finaciére, li est de touts importance qu' on dispose d' une terminologie normalisée, ayant des equivalences dans toutes les langues dans lesquelles sont signées les contracts. L' anteur montre sur la base d' experiences recueillies lors de participation á des comités d' etudes ou groupes de travail nationaux et internationaux, comment la commission electrotechnique internationale essaie de résoudre la probleme. Elle montre que seule une volonté de cooperation de tous les intéressés et une disposition aux compromise allies á la compétence des interlocuteurs peuvent aboutir á des solutions, qui par la competence des interlocuteurs peuvent aboutir á des solutions, qui par la suite, seront universellement adoptées. La terminologie doit avoir des bases scientifiques et linguistiques solides: elle ne peut être séparée de la definition des grandeurs physiques.un complement indispensable est la normalization des symbols littéraux, veritable sténographie de l' ingénieur pour designer les grandeurs et les unites dans des formulas, dans des prescriptions, sur des plaques signalétiques ect.ce que la CEI fait pour l' électrotechnique, l' ISO(=international standards organization) le fait plupart des autres domains de la physique.

T B 2

TECHNICAL WRITING - A PLEA FOR GREATER READABILITY

By Marian Owen

Biography

Miss Owen is a graduate of the University of Washington, and a Senior Member of the Society of Women Engineers. She spent 'the years 1955-1962 and 1964-1968with Pacific Northwest Bell telephone Company as an engineer primarily concerned with transmission problems and facilities planning. With the American Peace corps from 1962 to 1964, she was a teacher of electronic communications subjects at the University of Engineering and Technology in Lahore, Pakistan. Miss Owen is currently with. Farinon Electric of San Carlos, California, a firm engaged in development and manufacture ct microwave radio and telephone multiplex systems.

Summary

Research reports, operational procedures, maintenance manuals, factory test procedures - even popular science articles and some science fiction – are examples of the ways we explain our work. The best of technical Writing is- both accurate and readable. Assuming that the writer knows her subject and has sufficient language skills, accuracy can usually be attained by conscientious attention to detail. Readability, however, depends almost entirely en ability to tailor the text so that it will be understood by a particular audience. A technically sophisticated reader will be bored by the same material that appears impossibly complex to the uninitiated. The paper presents several alternative methods of organizing and presenting technical information.

T B 3

THE PROBLEMS OF DIRECTING SCIENTIFIC RESEARCH TOWARDS THE INDUSTRIAL NEEDS OF DEVELOPING COUNTRIES

By Ebun oni.

Biography

The author is a graduate of the University of Ghana where she obtained an Honours bachelor's degree. She later studied at the Imperial College, London, and obtained the M.Sc. and Ph.D. degrees of London University. She is a lecturer in the Department of Physics, University of Ibadan, Nigeria. She is working on several research projects in the Department and is involved with both undergraduate and postgraduate training.

Summary

The author has outlined the problems involved in linking the Universities with Industries in developing countries. These difficulties are due to the fact that most of the Industries are controlled by external investors. The National goal of developing countries must be the ultimate control of the Industrial driving force. Other problems emanate from the scientists themselves who must show urgent response to the Industrial needs of their country. The artificial barriers which at the moment exist between the scientists and the Industries must be removed and the Government must ensure that the existing Industries are involved in the training schemes and scientific research activities of the Universities and Institutions of developing countries.

TB4

EVOLUTION OF TELEPHONE SERVICE IN VENEZUELA

By Mercedes de Gooding

Biography

The author is a graduate of the Electrical Engineering School, Universidad central de Venezuela. She is working in the Telephone Company of Venezuela In planning of telephone exchanges since 1960. Actually she is in charge of the Switching Equipment Project Section.

Summary

The first part of the paper gives a panoramic view of the actual telephone situation In Venezuela, specially in the switching equipment field, taking into consideration the past process that produced this situation. The principal obstacles that had to be overcomed are mentioned, and the basic actual problems are presented. A comparison between Venezuela and other Latin-American countries is showed.

The actual Development Plans are revised and finally, some possible solutions, (according to the Author criterion, are proposed in order to improve the situation.

TB5

SATELLITE COMMUNICATIONS

By Maria Vadnjal

Biography

Maria Vadnjal was born in Gaporetto (now Yugoslavia) on 21 August 1925. She received the degree in Electrical Engineering from the University of Padua in 1947. In 1948 she joined the Faculty of Engineering of Padua where she has been Lecturer and teaching Assistant. Since 1968 she is Professor of Microwave Engineering of the University of Padua. She has performed research work in the field of microwave electronics and advanced development work as Consultant engineer in industrial communication Laboratories. Her principal research interest lies presently in Circuit Theory.

Summary

A brief account is given on the development of satellite communication systems from the beginning until present day realizations.

CONTAINERIZATION: **THE MODERN CONCEPT OF TRANSPORTATION**

By Olive Salembier

Mrs. Olive Salembier was educated in Canada, and after graduating from engineering short courses in packaging at several American Universities served as Staff Assistant, Engineering Extension Division, University of California from 1956 to 1960. She is National President and Senior Life Member of the Society of Women Engineers: Professional member and National Director of the Society of Packaging and Handling Engineers: and charter member of the National Packaging, Handling & Logistics Engineers and the Arizona World Trade Association, and is a member of the Packaging Engineering Honor Society Sigma Pi Epsilon. She was the first American woman to be nationally honored for Industrial Packaging Design, winning First Place Award for corrugated packaging in 1961 and Second Place Award for military packaging in 1965. Mrs. Salembier is a Packaging, Material Handling and Logistics Engineering Consultant in Phoenix, Arizona, and specializes in military and industrial packaging and in freight damage evaluation.

Summary

Analysis of the basic concepts of containerization in the physical distribution of goods is made with particular relation to the modern concept of transportation and its future possibilities. The basic advantages of containerization and the economics of container standardization in a variety of cargo handling methods are considered. The paper discusses significant changes in operational characterisitics of all types of cargo movement and the resultant development of specially designed terminals and equipment, and the use of computerization and automation. Cargo vans, barge-carrying ships, rail freight and the future of high capacity, high lift planes are discussed. Engineering requirements and technological restrictions for land and water movement are a constant challenge to man's ingenuity in developing intermodal methods adaptable to all types of cargo. With the continuation and acceleration of the containerization trend, even more massive container terminal facilities will be constructed in all ports of the world and these terminals will become super distribution centers acting as an interface between different modes of transportation.

TB 8

TRANSPORTATION OF HEAVY INDIVISIBLE LOADS

MRS. MAY MAPLE
C. Eng., F.I.E.E., M.W.E.S.

Contracts Officer with the
Central Electricity Generating Board
London E.C.I., England

MRS. MAY MAPLE was educated at Calder High School, Liverpool. She obtained the Ordinary and Higher National Certificates in Electrical Engineering at Acton Technical College (now Brunel University) and endorsements in physics and higher mathematics at Regent Street Polytechnic. Mrs. Maple obtained her practical training as a Third Assistant Engineer in the Chief Engineer's Department of the Central Electricity Generating Board's predecessors. She is at present one of four Contracts Officers at the London Headquarters of the Central Electricity. Generating Board and Head of the Electrical Section.

Mrs. Maple joined The Women's Engineering Society as an Associate Member in 1950 and became a Member in 1961. Among the positions she ha s held within the Society are Chairman of the London Branch, Advertisement Manager for the journal, Honorary Secretary, and Chairman of" the Articles of Association Sub-Committee. She was elected Vice-President of the Society in 1967 and became President in 1969.

SUMMARY

The paper describes new methods of sea and land transport which have been developed to enable larger single unitp1ant to be delivered to power station and sub-station sites than has hitherto been possible in Great Britain, or with very few exceptions in any other country in the world. New methods of carrying had to be devised if further development of power plant was not to be restricted and the new facilities should enable savings to be made in construction and operating costs of new power installations. The characteristics of the two special ships now in operation are outlined and the reasons given for evolving the type selected. The development of air cushion .equipment now being used for attachment to load transporters to reduce the stress on highways and bridges is described and the development of a prototype vehicle for off-the-road use over ground such as pasture and plough land, to aid access and minimise damage during construction of electricity-transmission works is also set out. In conclusion, a brief description is given of the development of a prototype multiple-wheel assisted -lift road transporter for heavy plant as a possible alternative under certain" conditions to the A.C. E.

T B 9

THE CHANNEL TUNNEL AND ITS EFFECT ON RAIL TRAFFIC IN WESTERN EUROPE

MISS H.L. BUSSELL, Senior Technical Assistant, Chief Civil Engineer's Office, British Railways, Western Region, Paddington, London, W.2.

Henrietta L. Bussell joined the Great Western Railway, Divisional Engineer's Office, and Cardiff in 1934 as a tracer, having matriculated at Bassaleg Grammar School, Newport, Mon., in 1933. In 1942 she was appointed to the Technical staff as a Draughtswoman and learned site survey work and leveling "in the field" becoming interested in the effects of mining subsidence and the remedial works required for maintaining the tracks in good condition. She also became involved in the engineering side of legal requirements affecting railways and the various Acts of Parliament governing these.

She transferred to the London Divisional Engineer's Office of the now Nationalised British Railways Western Region in 1948 and continued on the legal side of railway engineering, dealing with wayleaves and easements, land and boundary questions and such like.

In 1967 she transferred to the Chief Civil Engineer's Office, Road Bridge Section at Paddington, again connected with agreements and easements, but now concerned with bridges carrying roads and motorways over or under the railway.

SUMMARY OF PAPER

When the Channel Tunnel is finally constructed it will have a great impact on the trade between Britain and the neighbouring Continental Countries.

The paper covers the history of the Channel Tunnel project from 1802 to the present day and looks at the problems facing the designers through the years and how each in turn could have been overcome in their day and how they will be dealt with today

The operation of the tunnel and its terminals is described and also the envisaged use by Great Britain and Western Europe with the possible changes in exports and imports to and from these countries.

Finally, a critical look at the investigations into costing and the Viability/feasibility of the Tunnel.

TB 12

PROPOSED TRANS-ALASKA PIPELINE BACKGROUND ON THE LARGEST PRIVATE CONSTRUCTION PROJECT IN THE WORLD

By Irene L Ryan

Biography

The author is a graduate of the New Mexico Institue of Mining and Technology of Socorro, New Mexico. After graduation she worked as Consulting Engineer in the fields of civil, mining and petroleum. She completed work and secured teaching certificate in the field of Earth Science and Mathematics.

She is a member of several scientific and cultural societies and has published numerous reports and publications. Presently is Commissioner of the State of Alaska Department of Economic Development.

Summary

The paper contains a brief history the events culminating in the proposal to build a 1,300 kilometer pipeline across Alaska at an estimated cost of $1.5 billion. If developed this project will be the largest ever undertaken by private enterprise in man's history.

Also outlined are the engineering problems which have occurred in designing a pipeline to traverse a delicate environment with as little disruption as possible. Discussions are included of some of the technological solutions developed by the oil consortium and its consulting firms.

The impact of such a project on the United States and world oil markets is measured, as is the economic impact an Alaska.

T B 14

L ’ AEROTRAIN: TRANSPORT MODERNE DE L'AVENIR

Par Mlle Jeanine Plinate

Biographie:

Mademoiselle Jeanine Plinate est actuellement Chef de section d'études á l'Aérospatiale. Aprés s'être livrée sur des avions classiques á des études et des essais sur les vibrations et l'aéroélasticité, l'auteur s'est attachée á des travaux d'études pour les utilisations des terrains sommairement aménagés par des avions de transport de gros tonnages á attérrissages et décollages courts. Ces derniéres années, elle a participé, en tant qu'expérimentatrice aux études de faisabilité d'une structure de planeur hypersonique en vue des rentrées planées dans l'atmosphére aprés des vols orbitaux.

Resume:

Les besoins du monde moderne en matiére de transport nécessitent de mettre au point des systémes originaux : l'aérotrain en est un, intéressant sous bien des aspects.

L'aérotrain est.un véhicule du type aéroglisseur, sustenté et guidé par coussins d'air. La propulsion peut s'opérer, soit par turbomoteur et hélice carénée, soit par moteur électrique linéaire. II évolue sur une voie en "T" inversé.

Les travaux entrepris en France depuis 1965 ont conduit á la mise au point de véhicuies expérimentaux. Actuellement, la technique est maitrisée et permet d'ehvisager la réalisation de véhicules d'exploitation.

Les deux principales catégories d'utilisation actuellement prévues sont: les liaisons interurbaines rapides de 100 á 300 KID et les liaisons suburbaines (desserte des aéroports).

Grâce á sa légéreté, l'aérotrain se montre intéressant dans l'exploitation par sa vitesse, sa fréquence, sa facilité de pénétration, etc...

Du point de vue économique, l'aérotrain a un prix d'utilisation en France, de l'ordre de grandeur de celui du chemin de fer en Iere classe, done tres compétitif.

En égard aux nuisances, il ne provoque pas d'interruption des activités au sol, pas de bruit, pas de pollution, etc...

Aussi, l'aérotrain s'annonce comme un moyen de transport révolutionnaire par la qualité des services offerts. Essentiellement francais, il place notre pays au premier plan de cette technique nouvelle.

TC 1

INFORMATION HANDLING FOR AND BY ENGINEERS

By

Marion Scatcherd, BA CEng MRINA MIES
National Engineering Laboratory, Scotland

After graduating in engineering at Cambridge, the author was an apprentice in ship-building on Clydeside and involved for several years with ship design and production problems before becoming a management consultant with the Anne Shaw Organization. She is currently a Principal Scientific Officer with the Department of Trade and Industry at the National Engineering Laboratory in Scotland.

Information handling at all stages of engineering work, whether for design, production or management, and for all types of engineering, is a problem of increasing importance and interest. Several aspects of the topic are discussed with reference to the types of information, the differing circumstances of usage and the varying degrees of secrecy involved. A brief description is given of the assembling and preparing of data banks, the present manual and computer-based methods for handling, their difficulties and limitations, and' the current lines of developments being undertaken in the UK, with a wider look to the international scope. The main emphasis of the paper is on the potential methods of processing, the broader usages of data banks and the inevitable difficulties of hardware, software, 1iveware and data banks before the world of *1984* is achieved.

SOME APPLICATIONS OF COMPUTERS TO ENGINEERING

Peggy L. Hodges, M.A., C. Eng., F.R. Ae. S., F.I.M.A.

Senior Vice President Women's Engineering Society.

Winner of Whitney Straight Award 1970 for contribution to the field of avionics and guided weapon technology particularly in the use of simulation techniques.

Deputy Guided Weapon Project Division Manager (Systems) at Marconi Space and Defence Systems Ltd. - a company within the GEC-Marconi Electronics Group.

Graduated in Mathematics, Girton College, and Cambridge. Worked as Junior Radio Engineer at Standard Telephones & Cables Ltd. On airborne communication and blind landing equipment. Joined the Applied Electronics Laboratories of G. E. C. at Stanmore in 1950 and has since then been associated with the design and development of missile guidance equipment. Now responsible for general performance work including system studies, simulation, trials planning and analysis.

SUMMARY

This paper shows the many different ways in which computers have an application in the engineering industry of today. There are, in general; three basic types of application to engineering problems. First we have the fully automatic system, with computer-directed feed- back operating in real time and providing complete control of the system. The second type of application is that in which, although the computer is used on-line, the computer outputs are not used to control the system directly but instead provide information which is used for manual operation of the system. In the third way the calculations are carried out off-line and not necessarily in real time. Some typical examples are given to illustrate these three categories of computer applications.

TC 7

THE USE OF COMPUTERS IN PRODUCTION CONTROL

By
Sheena Inglis M.A.,
Associate Member I.E.E.
Systems Engineer

Biography

The author graduated with a degree in Engineering Science from Oxford University, England in 1963. Until 1967 she worked for the Central Electricity Generating Board on the development and design of the high-voltage transmission network. Having worked in Canada for a consulting engineer in the same field, she returned to England in 1968 and joined IBM as a field systems engineer.

Summary

The author begins by defining the problems of the Production Controller: to provide the right parts at the right time in the right place for the right cost, thus enabling the factory to produce finished products on time and at minimum cost, while utilising the factory facilities as fully as possible.

In broad terms the problem can be simply defined. In detail, further problems become apparent. In examining these problems and illustrating some of the techniques which can help to solve them it is shown that the Production Controller needs information, but that this information is useless, and can possibly be harmful, if it is not up-to-date. If the volume of work is large or complex, the paperwork necessary to provide this information expands enormously, and cannot be handled manually.

Computers can handle large quantities of data accurately and make it readily available to the user. The aim of the Production Controller must be to gain the maximum benefit from their use. Before installing a computer, he should review his present systems and see what additional benefits he can gain from the speed and power of his new computer-based systems. A computer will enable him to concentrate on general policies, on emergencies and exceptions, and on utilising fully every resource at his disposal.

TC 8

Micro-Computer Control of Radio Communication Systems

Miss Le Earl Ann Bryant

B.S.E.E. – Texas Technology University, 1965 M.S.E.E. with Bio – Medical Option – Southern Methodist University and University of Texas, Southwestern Medical School, 1969
Collins Radio Company Design Engineer, 1965 – Present

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Miss Bryant joined Collins Radio Company in 1965. She has participated in the research and development of digital control and display devices (including the design of a micro-control-computer) for Collins computer controlled radio systems. She has completed a company sponsored course in computer-aided Design of MOS (Metal Oxide Semiconductor) Components and is now project engineer for the design of MOS components related to digital control systems.

Miss Bryant is a member of the Society of Women Engineers, a junior member of the Society of Professional Engineers, and a member of the American Business Women's Association. She participates in the education activities of these organizations. She is also a member of the Institute of Electrical and Electronic Engineers.

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As the world has become more automated, people have grown to recognize the advantages of relieving themselves of routine tasks by converting manually controlled equipment to computer control. The continuing development of miniaturization techniques has further enhanced the use of computers in areas which were formerly restricted to hardwire switch control because of space limitations. One such area is radio control. Radio systems are being planned and developed which consist of one or a multiple of radios: receivers, transmitters, and transceivers, covering all frequency and power ranges. The purpose of this paper is to provide a general description of some of the micro-computers and radios which are available today and the systems which will evolve tomorrow.

The term "micro-computer" denotes a unit which has been designed with maximum use of state-of-the-art devices to minimize the space required for accomplishing functions previously assigned to large processors. The program in these computers may be stored in core or read-only memory modules or may be hardwired. The type of storage is determined by the space, power, cost, and programming flexibility requirements of each unit.

These micro-computers are being used to control a single radio or a network of multiple radios and their peripheral equipment (operator control, monitor, and maintenance devices). In some cases, the control requirements are as simple as turning a unit off and on, and in other cases they involve the co-ordination of operations between different devices in the same radio as well as the interaction of several radios. The computer which accomplishes these tasks may be located in one central location or may be distributed throughout the system. In either case, the goal is the design of a flexible system which will be able to operate in several configurations and which will grow to meet increasing requirements with a minimum amount of redesign and rework.

TC9

HIGHWAY RESEARCH INFORMATION SERVICES FOR DEVELOPING COUNTRIES

By Heloisa Medeiros

Biography

Miss Heloisa Medeiros, a Civil Engineer and Documentarist, is Head of the Documentation and Statistics Service of the Brazilian Road Research Institute, Rio de Janeiro, GB.(National Research Council). She is also Brazilian Coordinator of ISO/TC 97 (Computers and Information Processing) at the Brazilian Technical Standards Association (A.B.NT), and Delegate of the Brazilian Association of Women Engineers and Architects (AEAB) at the Brazilian Federation of Engineers' Associations (FEBRAE).

Fellowships: "Dorothy Leet Bursary" of the International Federation of University Women (IFUW) in 1968, to visit information service's and documentation centers in Europe end the United States, and Fellowship of the Organisation of American States (OEA) for a training session the Highway Research Board (Washington) by the programs of technical cooperation between Brazil and the United States (1971).

Abstract

The present paper suggests a program of work for the establishment at a highway research information service in a developing country, or area covering countries in the same stage of economic progress, linked with the International Road Research Documentation (IRRD) - designed by the Organisation for Economic Cooperation and Development (OECD) - the Highwa1 Research Board, and the international Road federation (IRF). The establishment of the Highway Research Information Service in the Brazilian Road research Institute was taken in consideration.

The program of work should consider as its main stages. (l) Information exchange agreements with already established highway research information service, (2) surveys on highway research current and published; (3) personnel training in a computerized highway research information service ;(4) installment of a computerized system for the information retrieval.

Agreements with computerized highway research information service and the resulting information exchange and personnel training, allow for the establishment of an highway research 1ntormation service in a developing area or country, within limited resources. Thus its users will have the data they need for the study of better and less expensive methods of road construction for the expansion of the highway network in a mere effective form, also giving indirectly more credit for the foreign investment to this end.

A paper under this title 8ubmitted by the author to the VI World Highway conference, held by the International Road Federation in Montreal, Canada, in October 1970, may be considered an interim report on the subject.

T C 10

L'INFORMATIQUE AU SERVICE DE LA PRODUCTION INDUSTRIELLE

DANS LE DOMAINE DE L'OPTIQUE

Par Gisele HUGUES

Biographie

Madame Giséle HUGUES est Licenciée Es-Sciences.
Ingénieur diplomée de 1 'Ecole Supérieure d'Optique.
En 1946-1947 Ingénieur á l'ONERA: Recherches sur la Spectrographie.

En 1948 abandon de 1a vie professionnelle pour raisons fami1iales, mais continue néanmoins á participer aux recherches de son mari Ingénieur Opticien dans le domaine de 1'éclairage, de la signalisation automobile et en 1956 dans le calcul optique sur ordinateur.

En 1968, reprend une vie active professionnelle á 1a Société CERCO (Centre de Recherche et de Calculs Optiques) dont son mari est 1e Directeur.

Résumé de la communication

Les combinaisons optiques, d'abord purement empiriques, ont été au début du 17 éme siéc1e assujett1es au calcul grace á la découverte de diverses lois physiques. Ce calcul s' est transformé a partirde 1950 grace á l' apparition des ordinateurs.

Les schémas de calcul ont progressé de deux maniéres:

- d'une part, en exprimant le contenu de certaines lois physiques fondamenta1es (Principe de Fermat);
- d'autre part, en accédant aux dérivées partielles des abérrations par rapport aux paramétres de construction~

Nous arrivons ainsi á des systémes comprenant couramment 20 á 50 équations pour un nombre équivalent d'jnconnues.

L'espace des paramétres X étant immense et le nombre des conditions étant trés grand, 1es solutions proposées sont innombrables et l'Ingénieur doit faire appel de nouveau a l'empirisme pour trouver une solution val able.

L'introduction des surfaces asphériques est une solution dans certains cas, mais elle est 1imitée par 1es difficu1tés de réalisation.

Rea1isations récentes fantasies effectuées grace á la puissance des ordinateurs:

- objectifs á focale variable,
- objectifs á grand champ,
- objectifs spéciaux de photo-aérienne á haute altitude,
- objectifs photo-réducteurs indispensables á la fabrication des circuits intégrés.

Réalisations faites en 1971.....

T C 12

Progress - Challenge to Computers

By Grace Murray Hopper
Commander, USNR, Ret.

Grace Brewster Murray was born on 9 December 1906 in New York, New York. She attended Vassar College, .graduating in 1928, with Phi Beta Kappa and a Vassar College Fellowship to study at Yale University. There, she received the degrees of MA in 1930, and PhD in 1934, together with election to Sigma Xi. She returned to Vassar as an Assistant in Mathematics in 1931, becoming successively, Assistant Professor, and Associate Professor.

In December 1943, she entered the United States Naval Reserve, was commissioned Lieutenant (JG), and ordered to the Bureau of Ordnance Computation Project at Harvard. Here she learned to program the first large-scale computer, Mark I. In 1946, she resigned from her leave-of-absence from Vassar and joined the Harvard Faculty as a Research Fellow in Engineering Sciences and Applied Physics at the Computation Laboratory where work continued on the Mark II and Mark III computers for the Navy. In 1946, she received the Naval Ordnance Development Award.

In 1949, she joined, as Senior Mathematician, the Eckert-Mauchly Computer Corporation in Philadelphia, then building the UNIVAC I, the first commercial large-scale electronic computer. She remained with the company as a Senior Programmer when it was bought by Remington Rand. She was appointed Systems Engineer, Director of Automatic Programming in 1952 after publishing the first paper on compilers. In 1964, she became Staff Scientist, Systems Programming. She is presently on special military leave from the UNIVAC Division of Sperry Rand Corporation. During .the years from 1952 to the present, she has published over fifty papers and articles on software. Since 1959, she has served on the faculty of the Moore School of Electrical Engineering of the University of Pennsylvania and holds the title of Visiting Associate Professor of Engineering.

In 1962, she was elected Fellow of the Institute of Electrical and Electronic Engineers. In 1964, she was selected to receive the 1964 Achievement Award by the Society of Women Engineers. In 1969, the Data Processing Management Association selected her as their first Computer Sciences-“Man of-the-Year.” She received the Harry Goode Award from AFIPS in 1970.

She maintained her close connection with the Naval. Reserve and at the end of 1966, she was retired with the rank of Commander in the Retired Re serve. She was recalled to active duty on 1 August 1967. She is presently serving in the Information Systems Division of OPNAV.

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Today, almost every facet of technology makes use of computers in someway. The rapidity of technological changes, the expansion of concepts and problems together with the new techniques for computer application to social studies has made computers an indispensable tool in all classes of research. Therefore, planning for research .therefore, planning for research – planning for progress - inevitably involves planning for the increased use of computers. The developments which can be anticipated in the '705 in computer hardware, software and management are considered together with their implications for and impact on training, teaching, usage and management. Some of the eventualities which can be expected to occur are discussed together with the decisions that will have to be made.

TD1

DWELLING: IMAGE OF OUR SOCIAL PROGRESS

BY: ARQ. ESTEFANIA CHAVEZ DE ORTEGA

CURRICULUM VITAE.-

Nationality, Mexicana,

Professional Title of Architect in 1954, studies in urban and. Regional Planning in 1970 in Escuela National de Arquitectura (ENA), University Professor since 1959 in ENA, of several subjects in. City Planning; Urban economy, urban sociology, History of cities, City planning, urban design and Urban design Workshop.

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Several administrative jobs in the Urban Seminary in the ENA, several jobs of urban planeation for some cities in Mexico, actually assessor in Urban Planeation of the Tabasco Government. According with her husband Arq. Carlos Ortega Viramontes, she also had worked in some housing proyects in Mexico City, Tux-tepec, Oaxaca, etc.

She had give several conferences in some cities and universities of Mexico City and U.S.A, participation in scientific, cultural and international lectures .She belongs to several National and foreign scientific and -cultural Societies.

SUMMARY

The urban problems are symptom phenomenons that reveal a confusion of the functions in the social, cultural, economical and political structures of the populates centers that suffer with this signs, the knowledge of this matter will permit us to profile and formulate the necessary polities that may impose to the new social relacions a. guide to succeed in avoiding the great conflicts that bring out because of this alterations.

T D 3

THE PROBLEMS OF HOUSING IN THE ASPECT OF MODERN FAMILY STRUCTURE AND THE TECHNICAL PROGRESS

By Mrs. Izabela Kuninska: Zachwatowicz - Architect M.A.

Biography

Borm 27.X.I923 in Paris. Since 1924 living in Warsaw.
1931-1939 public schools in Warsaw. Secondary school certificate - 1939.
1942-1944 studies at the clandestine Faculty of Architecture at the Technical University in Warsaw.
1944 - Warsaw Insurrection - Stretcher bearer.
After the war: 1945-1948 studies on the Faculty of Architecture at the Technical University in Cracow. Master's degree - 1948.
Since 1950 professional work in Warsaw.
Research work: 1945 - 1949 assistant at the chair of architectural design, Technical University in Cracow.
1957 - 1963 - lecturer in the Institute of Town planning of the Polish Academy of Science.
Architectura1 work: 1950 - 1962 Architectural State Office-designs in the domain of housing and public buildings.
Since 1962 - chief of group in the State Office of the Ministry of Transport. Designs - housing and industrial buildings. .
Member of the Polish Architects Association.
Knowledge of languages: English, French, German, Italian.

Summary

The constant and progressive demographic growth of world's population imposes also to housing difficult and important tasks. The general industrialization causes an unavoidable phenomenon of urbanization that means concentrated forms of human habitations together with their involved infrastructure, social and psychological consequences.

The problems pf housing cannot be resolved "in abstracto" as it times done in external visions of the towns of the future. The basic of housing is always a Family; together with characteristic features structure and fluctuation of its needs. .

The cycles of family development postulate a variability in time. Different consequences arise from the inconstancy of the equipment of this group of things, we could call infrastructure of family life. Those elements on variability in family cycles and in the adjustment to new needs and conditions require a high level of technological elasticity in housing. One must remember that the moral old age of an. ap: attonrritbuilding, appears much earlier than the technical destruction and the amortisation. It is therefore absolutely important to follow the right direction for housing, in the range of structure, methods and technology. Those directions must not only allow to satisfy quickly and completely the needs of contemporary housing, but assure a possibility of constant modernisation and changes - that means maximum flexibility in the complex problem.

T D 4

HOUSING HEADACHES IN THE USA

ELSIE EAVES, B S (C E) University of Colorado, Boulder ‘ 2O P E 19001(NY)Civil Engineer, Port Washington, N.Y. Consultant on housing costs to the National Commission on Urban Problems, 1967-69. Author, its Research Report No. 16, "How the Many Costs of Housing Fit Together"

Miss Eaves began her career, doing calculations for a mining engineer in the Colorado Rockies while still in Idaho Springs High School. During college her summers were devoted to computing or drafting for the Denver & Rio Grande Railroad and the U S Bureau of Public Roads. In 1921 she taught engineering mathematics at the University of Colorado through June, then did calculations and drafting for the Colorado State Highway' Department in Denver.

From 1922-Feb. '26 she was office engineer for Col. Herbert S. Crocker, consultant, and for Crocker & Fisher, construction contractors in Denver. She joined Engineering News-Record in New York City in 1926 in charge of construction market research until 1932 when she was made Manager, Business News Department in charge of all construction costs and price reporting and of cost and price indexes. She retired from ENR in 1963 and opened her office as a consultant.

Miss Eaves is a Fellow of the American Society of Civil Engineers, a member of American Association of Cost Engineers, New York State Society of Engineers, Colorado Society of Engineers, Society of Women Engineers, USA, and Women's Engineering Society, Great Britain. Honors include its Award of Merit, 1967 by AACE, Chi Epsilon, University of Colorado, Tau Beta Pi, Colorado .Beta. Who's Whos are: in Engineering, of American Women, in the East and in Finance and Industry.

She is a member of the Board of Administrators, North Shore Junior Science Museum, Roslyn Harbor, N. Y. and a member of the Women’ s Council of the New York Public Library. Her hobbies include remodeling an early American house, swimming, gardening, motoring, working on technical societies committees.

* * * * *

This paper will summarize efforts by Federal, State and Local Governments, Manufacturers, Engineers, Architects, Builders, Labor Unions to reduce unit cost of housing. The housing crisis in the USA combines the need for 26,000,000 new units with such high costs that even moderate income families can no longer meet unsubsidized rental or ownership costs. Low-income family housing has long been subsidized. Forces back of this dilemma include unprecedented high land prices, high mortgage interest rates and discounts and high labor costs. In addition, a multiplicity of local building codes, land zoning and labor union regulations have perpetuated traditional building methods and prevented or restricted large-scale “industrialization” -- prefabrication, sectionalization, systems construction, modules, mobile homes. This paper will cover changes in land use, new towns, townhouses, multi-story, multi-purpose structures, air rights, turnkey contracts, cooperatives, condominiums, mortgage terms, mortgage insurance, new mortgage markets, performance building codes, types of industrialization in use, under study or being tested.

T D 5

REQUIRD FACTORS FOR THE SUCCESS OF A NATIONWIDE FACTORY PRODUCED HOUSING INDUSTRY

by
Patricia Gail Burnham, P.E.

Patricia, Gail Burnham is a registered mechanical engineer. She graduated from the University of California. Specialization within the mechanical engineering major included characteristics of supersonic fluid flow and stress analysis emphasizing experimental techniques.

A resident of Sacramento, California, Miss Burnham has been employed at McClellan Air Force Base for over seven years. The first six years were spent as a design engineer for the Base Civil Engineering Office. She designed building systems, utility plans, heating, refrigeration, and air conditioning systems including environmental control for computers and clean rooms. She has served, also, as a physicist for the Materials and Processes Testing Laboratory, and now performs planning and program development for the Industrial Engineering Division.

Miss Burnham is a member of both the California and the National Society of Professional Engineers in the United States.

SUMMARY

There are two sub-classes of factors necessary for the success of nationwide factory produced housing. The first class includes the technical and economic factors necessary to support the industry by making factory produced housing economically feasible. These determine the success of the production program. The second class of factors defines the impact of the housing on the nation's life style and environment.

The factory produced housing industry has shown numerous past, failures due to over-concentration on narrow technical problems. In this day of supersonic transports, the technology required by housing is comparatively simple. What is lacking in the attempts to develop the industry is a number of planning measures. These measures influence factors, diverse as intermanufacturer coordination. Planning for iterative design, user influence on the design process, arid national building code and land use agencies.

T D 6

HEALTH, EDUCATION AND WELFARE

CONSTRUCTIVE CONSTRUCTION FOR PEOPLE

By Elizabeth Jacobson Rogers

Biography

Elisabeth Jacobson Rogers, currently an architect with the Facilities Engineering Construction Agency pf the Department of Health, Education and Welfare, received her B.A. degree from Downer College, and her M.A. and M, F, A. degrees from the University of Iowa. She is native of Milwaukee, Wisconsin, and a resident of San Francisco, California. As a career civil service employee she began with the Army Corps of Engineers, transferred to the Navy where she spent over ten years in public Works Design with additional duties as a consultant on Ship's habitability, In addition, she was a commissioned Officer in the Naval Reserve. As an employee in the Department of Housing and Urban Development she began work on the school and Academic Facility construction Programs which were transferred to the Department of Health, Education and Welfare, A recent consolidation of construction services within the Department established the new Agency,

Elizabeth is married to Glenn Rogers, Facilities Engineer for Commander Fleet Air Alameda at the Alameda Naval Air Station. They have a six year old daughter, Heidi Elise.

Mrs. Rogers is President of the San Francisco Chapter of Federally employed Women, a Senior Member of the Society Of Women Engineers, a member of the Society of American Military Engineers and of the Royal Society for the Protection of Health.

Summary

A single construction service activity for the Department of Health, Education and Welfare provides national leadership in the development of health and education facilities which includes the administration of grant programs in these fields. The people are benefited by more efficient use of resource. - In project administration, the promotion of research and development, and application of cost saving techniques such as value engineering and systems building. To accompany these endeavors, the encouragement of the development of standard test methods for building Construction to assess performance of systems buildings the establishment of a national building code, and the conversion to the metric system are additional constructive challenges. In addition, The Agency has direct construction work in the fields of health, education and welfare. This includes construction of facilities for Health Services and mental Health Administration, National Institutes of Health, environmental Health Service, Food and Drug Administration, school Assistance in Federally Affected Areas, and the Social Security Administration. the Department's direct outlays for construction are approximately $ 100 million a year but the grant and loan programs to states and localities are about $ 1 billion a year which in turn generates about $ 4 billion a year in construction - truly a measurable contribution in the field of constructive construction for people.

TD7

UNE SOLUTION FOSSIBLE AU FROBLEME DES TAUDIS AGGRAVES PAR LA LOI SUR LE BLOCAGE DES LOYERS.

Par Susana GODOY CASTRILLON.

BIOGRAPHIE

L' auteur est diplômée de L' Université Nationale Autonome de Mexique (U.N.A.M.). Aprés avoir obtenu son diplôme, elle a travaillé plusieurs années á des projets et des calculs de structures de béton armé et de béton précontraint , á México et á Paris. Depuis 1963, elle est professeur á L' Institut Poly technique National (I.P.N.) ou elle donne des cours de Béton Armé et d' Orientation Professionnelle.

En même temps elle dirige officiellement le programme de Renovation Urbaine de L' lnstitut National pour Ie Développement de la Communauté Rural et de L' Habitation Populaire, (I.N.D.E.C.O.) dans les quartiers Guerrero et Peralvillo á la ville de México.

De facon privée, mais en coopération avec le Gouvernement de L' Etat de Méxicop elle dirige le programme des réseaux urbains dans Ie quartier Manantiales á la ville de Netzahualcoyotl, Etat de México.

SOMMAIRE

La croissance accélérée de la surface métropolitaine de México a eu par effet, entre autres, les habitations décadentes ou taudis localisées au centre de la ville, agravés par la Loi sur le Blocage des loyers.

Une solution poseible á ce probléme a été envisagée par la construction des immeubles en co-proprieté, construction á la quelle participeraient laspropri6taires du terrain, les locataires des ancienstaudis et des autorités. Cette solution est mise en pratique en tant que plan pilote dans Ie quartier de Peralvillo a la ville de México.

TD9

HOUSING AND RESETTLEMENT PROBLEMS IN TURKEY

By Prof.Hande SUHER Arch.Ing.

Biography

Mrs. Hande SUHER, 41, was graduated from faculty of Architecture of the Technical University of Istanbul-Turkey in 1951. in the same year she joined academic career as assistant professor of Town planning Chair of the same faculty. She has got associate professor degree in 1956 and full professor in 1965 in the same chair.

She has published three books, several articles in professional periodic. And given several papers and conferences in national or international meetings. She is now Professor of the Town Planning Chair. Member of the Administrative Council of the Town Planning Institute, and Editor of the Journal of the Town Planning 1natitute of the Faculty of Architecture of the Technical University Istanbul-Turkey.

Parallel to her academic career she has always worked as a free architect. She has got several degrees from architectural competitions. She is now building up a Hotel in Istanbul having 459 rooms, which has been a first prize of a limited international architectural competition

Summary

Turkey is a country in the process of development. The aim and the direction of its social and economic development has been determined by a development plan arranged for every five program basis.

The urbanisation which has been considered as an event that should and could be prevented and an undesirable phenomenon is now treated as a factor of economic and social development, but the urbanisation in developing countries. Generally having some characteristics of a demographic growth, is different from the urbanisation of industrialized countries, the development of the urban spaces in developing countries does not proportionaly follow the development of the urbanisation. The local financial and technical sources and existing urban structure are not sufficient to solve the problems of urbanisation related to the space organisation. The migrant populations from rural areas are mostly alone to solve their housing problem, building up their own houses by themselves. .

This kind of dwelling areas called "gecekondu", like barriadas or squattets are the results of a demographic urbanisation in developing countries. The problem created by them is great for today's Turkey having a population of 35.000.000; but, the problem for Turkey of the year 2000, with an estimated population of 85.000.000 will be greater as a problem how to organize the whole country space for this population all together with all necessities.

T D 10

DESIGNING AND PLANNING WITH THREE-DIMENSIONAL MODELS

By Prof.Dr.Eng. Liana Ferraris Zetto

Biography of the author

Prof. Dr. Eng. Liana Ferraris Zetto, industrial mechanical engineer, was the first woman graduate in engineering at the University of Trieste.

Her first post was as lecturer in applied machine mechanics at Trieste University. Following this, she devoted herself to teaching in the technical schools (technology, laboratory technology, applied meohan1os, marine mechanics).

She has been engaged in the study of applied mechanics, and has studied in depth the designing of mechanical parts in the naval field.

At the moment she is headmistress of a middle-school in Trieste, and is studying the theoretical problems inherent in the representation of the soil.

Prof. Dr. Eng. Ferraris Zetto has also had a number of articles published in technical journals.

Summary

The 3-dimensional model, a means of expression used since the dawning or civilization, finds today various applications in the technical field and it is forming for itself a place in many others.

Ignoring those models used for advertising purposes and those used in the study of natural phenomena and special constructions made and dimensioned according to strict scientific laws, we will examine the use of the scale-model in industr1al and zonal planning.

The use of models in the planning of processing plants is already standard practice in the more industrialized countries.

Once the various processes have been decided upon, and the machinery has been chosen and its size established, a fairly de tailed model allows one, at an early stage of high-level planning, to fix the basic points and know the general direction which must be followed, and in the successive phases eliminates interfer once from the planners. All of this saves time and materials, and allows one to fully employ the space at one's disposition, and to organise the plant's maintenance well in advance.

The full effectiveness of the study-model, in these days when town and zonal planning is no longer deferrable, is now being realised. The model is constructed in close contact with the interested speoia1ists, by means of a close analysis or all the elements to be included. Thus, the three-dimensional model will contain much more information than any map or plan of the same scale, and offers the workers an immediate and complete vision of the area in question. They can study the various possibilities and transfer the best onto the model with a noticeable saving of both time and money.

T D 11

GEOPHYSICS, THE BASIS FOR ENVIRONMENTAL CONTROL IN COMMUNITY PLANNING

By M. E. Russell

Miss Mary Ellen Russell graduated from the University of Washington with a B.S. and an M.S. in Mathematics, Geology, Zoology, and Education. She completed additional post-graduate work in Geology and Mathematics at the University of Washington and Statistics at Stanford University. She was a Science and Mathematics teacher from 1936 to 1942, when she joined The Boeing Company. Her work there has included mathematical analysis and approximation techniques, analytical problems in the field of Geoastrophysics, visual search technology, and the use of digital and analog computers. She is now an engineer in the Computer Services Division of Boeing, responsible for the configuration design and analysis of special purpose equipment. She is an associate member of Sigma pi and a member of Phi Sigma, Pi Lambda Theta, and the American Association for the Advancement of Science, the American Association of University Women, the Institute of Electrical and Electronic Engineers, and the Society of
Women Engineers.

SUMMARY

Planning for building new communities or revitalizing existing ones uses many aspects of Science and Engineering. Geophysics, the physics of the earth, taking into account Geology, Meteorology, Hydrology, Oceanography, Seismology, and Volcano logy, can be the steppingstone to man's prudent use of his environment. The study of the nature and properties of the materials composing the earth, their distribution and effect on the landscape determine where we establish our cities and towns, how we build, and the materials to be used. The effects of climate and weather are important. Water is a means of transportation and a source of food and power. An understanding of the forces of Nature can lead to avoiding or minimizing the destructive power of earthquakes, volcanoes, glaciers, hurricanes, and floods.

The nature and size of a community must be governed by the continuing availability of natural resources, even in remote areas which the community reaches out and touches. Our earth has great potential, if man will use it wisely, profiting by his mistakes, and basing his future actions on understanding and working with Nature. Controls and Engineering ingenuity can resolve the conflicts in developing a community and, at the same time, preserving and maintaining the environment.

T D 12

THE NEED FOR HYDROGEOLOGIC STUDIES IN URBAN PLANNING IN SEMI-ARID AREAS

By Judith L. Hamilton

Biography

B.A. in Geology, Smith College 1961. M.S. in Civil Engineering, University of Illinois, 1964.

Miss Hamilton is registered professional Engineer New Jersey and Colorado and currently Engineering Geologist and Soils engineer at Willard Owens Associates, Denver, Colorado. Previous experience; assistant project engineer, Woodward-Clyde and Assoc., Clifton, New Jersey; civil and structural engineer, U.S. Bureau of Reclamation.

Summary

In the Western United States expanding urbanization is both increasing the need for Water and causing significant changes in ground water levels and conditions. .

As cities expand and new communities are formed, existing water supplies are often insufficient. Surface supplies in many areas have already been allocated and cannot provide additional water for urban use. Even where surface water is available, ground water supplies have numerous advantages over surface supplies.Hydrogeologic studies can locate new or supplemental ground water supplies and point out locations for new cities and developments where groundwater supplies are most abundant. Hydrogeologists, can design well systems to most effectively utilize the available ground water supplies.

While the major water problem is the location of additional supplies, locally there are cases of excessive groundwater. Rises in ground water levels caused by urbanization can also cause problems. In the semi-arid climate, lawns require large application of imported water, percolation of this water into the soil raises the ground water levels, often sufficiently to cause basement flooding. Streets, driveways and roof tops decrease the area available for absorption of rainfall, and runoff is increased. Often inadequate provision for disposal of runoff has been made, resulting in ponding of water in certain areas and local rises in ground water levels. If ground water levels in land fill areas are high, leaching of pollutants and contamination of shallow ground water may occur.

An adequate hydrogeologic study of an area prior to development can define areas of potential problems and point out methods of preventing these, problems through planning. This requires the cooperation of planners) engineers designing street and sewer systems architects local government officials, contractors and homeowners.

The hydrpgeclogist thus has a role which is not only investigative but also educational and remedial. Investigations and recommendations do little good unless they are understood and incorporated by planners and builders. Through cooperation among all groups many water problems will never arise.

T D 15

OPEN SPACE SYSTEM STUDY FOR THE DACCA METROPOLITAN AREA

By Wajeda J. Rob

Biography

The author is a graduate in architecture from the East Pakistan University of Engineering and Technology (class of '67). Her special field of interest is landscape architecture, in which field she did graduate level work in Texas A & M University (class of '70). She is a lecturer in EPUET. Here she helped to develop a Master Plan for the campus.

Member of a team of researchers who prepared the report for Mobile Health Units: 2 Systems, published jointly by the U. S. Health Services and TAMU, the author also worked as consulting architect for the Mary Rutnam University Hospital in Ceylon. Her special interest is to work in an interdisciplinary team of design professionals. She is a member of the American Society of Landscape Architects. She is married to Khandker Shahidur Rob, a talented young architect.

Summary

An investigation was conducted to establish land of intrinsic open space value through an ecological approach. This was prompted by the fact that open space facilities proposed in the Master Plan for Dacca, 1959, based on zoning by land subdivision, although inadequate in terms of population needs, were never realized - partly due to their turnover to other land hungry urban developments.

Water and wet land, settlement pattern, transportation, location, and related features were analysed. The analytical facts were synthesized to socio-cultural image study, road system study, and finally, to open space system study. It was established that the rivers, canals, wetlands, encircling Dacca could be the median of an open space system developed with the compatible land uses of flood and erosion control, drainage, water supply, agriculture, water transportation, recreation, and water related industries.

T D 16

URBAN RENEWAL PROBLEM IN TURKEY

By Dr.Ing-Arch.Ayten CETİNER

Biography

Born in Istanbul, Dr.CETİNER graduated from Istanbul Technical University in 1954. After graduation she worked as consultant on Metropolitan areas physical planning in city municipality Technical bureau up to 1960. At that date she was invited to join the Town and City Planning Department of Istanbul. Technical University. She won her ph.D.degree by the acceptance of her thesis on "Physical planning activities in Turkey and their principles". Presently, she is working on an associate Professorship thesis called" principles of equipment in city planning procedures".

She is married and have a daughter.

Summary

The structural fabric on which various function areas are set up in cities displays an heterogeneous continual variance. The broadening of human needs, stresses of economic conditions, effects of social organism, increases in transportation means, the withering of sanitary potentialities in existing sites require the 1nnovation of urban structures thorough a process of urban renewal.

Several of the world's cities confront with this important crisis. Neverthless, every country in the world do battle with this problem within their own economic, administrative capacities and in proportion to their technical know-how and empirical conceptions.

The upward surge of the industrialisation and urbanisation phenomena in Turkey creates an urban renewal problem, especially in centers of cities. But the inadequate cogency of technical, economic, administrative powers of local governing bodies entails difficulties during the planning and implementation periods.

However, some positive work is being done presently, for the determination of an orderly physical planning system compatible with urban renewal principles and giving guidance to solutions of problems caused by industrialisation events. Consequently, some additional tasks are imposed upon public institutions, new financing ways and means are queried, and certain legal provisions relative to land policy to be followed, are contrieved.

T E 1

DIGITAL INSTRUMENTATION

By Michela Vannini Scagliotti

Biography

The author is a graduate of the Politecnico of Milan. After graduation she worked some years at Soc. Edison in Milan. After her marriage she began her work at Rome University as assistant and researcher. At present she is Libero Docente in Electrical Measurements and her research activity is summarized in 13 papers, the most of which with coworkers.

Summary

A short investigation on digital instruments is reported. After some general considerations the most important types of digital instruments are considered; among them some studied and realized by the author with coworkers at the Laboratories of Rome University are also investigated.

T E 2

LIMITS OF MEASUREMENT ACCURACY IN INDUSTRY

By Constance E. Arregger M.Sc., F.Inst. P.

Biography

The author took a degree in Physics at the University of Liverpool followed by research work in Magneto optics. Her practical working experience was first in the Metrology Department of the National Research Council in Canada and then with Messrs. Hilger and Watts (now Rank Precision Industries) in England.

Her speciality has always been High Precision Measurement including work on International Prototype Standards of Length, Diffraction Gratings and interferometric techniques. She is now working as a consultant for Rank Precision Industries; she has been active in the Optical and Education groups of the Institute of Physics and has written various papers. She is now editing an ABC of Optics and is writing a book on Precision Scales and Measurement.

Summary

Progress in constructional and engineering work depends on the ability to measure; the limits of accuracy of measurement have been refined through the years and particularly during the last few decades. Units of length have changed from human feet to the wave length of light. .

Mass production, probably resorted to initially to it the manufacture of armaments, necessitated dimensional control for ease and interchangeability during-assembly and gradually more and more sophisticated measuring instruments were developed for use in the workshop and the Standards Room. With the advent of mechanisation and automation with on-line production with minimum human intervention testing for dimensional accuracy must be almost instantaneous and new techniques have had to be introduced. By means, for instance, Of transducers error signals are amplified and fed back to control the input or the adjustment of the machine in order to rectify the errors or error-tendencies wit minimum loss of time, and hence, production. These new techniques are described and there is a discussion on the 'real' accuracy required; how it is influenced by machine wear and ambient conditions and how the- pursuit of accuracy affects costs.

T E 3

THE ROLE OF MATERIALS, FINISHES AND PROCESSES

IN INDUSTRY IN THE 1970's

Mattie F. McFadden, P.E.

Miss Mattie F. McFadden graduated as a special CVA student in aeronautical engineering from New York University and studied metallurgical engineering at New Haven College. She is manager of the Materials, Processes and Standards Department at Raytheon Company, Bedford, Massachusetts, U.S.A. Miss McFadden is a Registered Professional Engineer (metallurgical) in the Commonwealth of Massachusetts and holds the distinction ,of being Chairman of the Society of Automotive Engineer "Electronic Materials and Processes Committee" serving the Aerospace Division in the U.S.A. A recognized authority in the field of materials and processes engineering, she has also assumed work assignments in Europe, is the author of over twenty published articles and is a contributing author to the "Metals Handbook" published by the American Society for Metals.

Summary

Never in history has industry had available such a great variety of materials with which to construct their products. The electronics industry, for example, has extended the state of the art to produce a complete electronic circuit no larger than a postage stamp, made possible by precise selection of a variety of materials which are deposited to produce specific electrical properties. These and other materials used in world wide communications, aircraft guidance, underwater applications, computers, kitchen stoves, and other industry made equipments, vehicles, and implements affect each of our daily lives in one way or another.

Some new and unusual materials and how they are finished and processed will be discussed to point up the high degree of sophistication present in industrial uses today. The increased use of plastics and new developments in metals will be explored to show both the technical and sociological involvements. Whereas some materials contribute to our environmental problems and some cause challenges for waste disposal, treated with respect and properly handled, there are materials and processes to meet any challenge man could envision. With new materials continually being developed, the indicated trend for the next decade is very exciting.

T E 4

IMPROVING EFFICIENCY IN THE CONSTRUCTION INDUSTRY.

Veronioa Milligan, B.A., C.Eng. M.I.E.E., A.M.B.I.M.
Senior Partner - "CIVLEC" Advisory Industrial Development Services.

Veronica Milligan obtained an, Arts Degree and a Diploma in Education at the University of Wales, and later studied Electrical Engineering and Management Studies at the Glamorgau Polytechnic. She held senior engineering posts in maintenance, planning and construction in the electricity supply industry. She was the first woman to become a Senior AD.thorised Operational Engineer with the South Wales Electricity Board. She became an engineering and management consultant and is now a Senior Partner in a firm of Management Consultants who specialist in the construction industry. Recently she has been on a two year attachment to the Manpower and Productivity Service *or* the. G.B. Department of employment and Productivity as a consultant for the construction industry. She lectures part-time on Management Studies at the Glamorgan Polytechnic.

SUMMARY:

Various divisions of the construction industry - building, civil engineering and mechanical construction - are defined and their importance discussed. A brief outline is given of developments in the last twenty years with particular reference to improvements in production of old materials, the. Use of new materials and new techniques. Present research and experiments in Great Britain are touched upon.

The paper is concerned chiefly with the problems of major construction sites and the areas where the greatest impact can be made on the efficiency of the industry. Illustrations are given of the adverse effect on efficiency of certain architectural and design developments, the rapid increase in size of construction projects, and the major increase in services content in major buildings. The implications of one-off prototype construction for project and site management are discussed. Illustrations are given of the effect of these developments on labour, with particular reference to strikes, wages, safety and training. Comparisons are made between power station construction in the U. S.A., Canada and Great Britain.

Methods by which it is anticipated improvements will be made in the future are outlined.

T E 6

INDUSTRIALIZATION AND ELECTRIFICATION OF TROPICAL REGIONS AS A NECESSARY PRECONDITION FOR LIVING STANDARD INCREASE IN DEVELOPING COUNTRIES

By Bernarda Bartáková

Biography

The author is a graduate of the Faculty of Electrical Engineering in Pilsen. After graduation she joined the scientific staff of the National Research Institute for Electrical Engineering in Prague. Her work has been mainly concerned with climatic and operation action on electrical equipment. She also took prominent part in developing the research laboratories and tropical atmospheric stations in China and Vietnam. She worked in the Research Institute in Canton three years and then undertook some further study trips within the framework of these problems to India and the Near East.

The author is co-author of the book "Tropicproofing Electrical Equipment" published in several languages and author of 20 various-scientific papers and of a number of research reports in this field. She gives lectures on these problems at the Technical University of Prague.

She is the scientific secretary of the Section of Technical Sciences at the Committee for the Complex Research of Developing Countries of the Czechoslovak Academy of Sciences. In 1968.she obtained the degree of Ph D.

Summary

The topic of the contribution is the problem of industrialization and electrification in tropical regions which may be ranged with the decisive resources of the living standard increase.

Common aspects of this problem as well as technical and social problems approached during this process are reported here.

The contribution brings concise suggestions of remedial methods enabling the optimum mastering of these intricate problems.

T F 1

SAFETY - An Engineer's Responsibility

Lydia I. Pickup

CURRENT POSITIONS

Specialist Engineer, Aerospace Group, the Boeing Company.
Board of Trustees, Boeing Employees' Good Neighbor Fund.
Co-chairman Professional Affiliation and Advanced Planning Committee, Women's Division, Evergreen Safety Council (Wash.).
U.S.A. Representative to Third International Conference of Women Engineers and Scientists (Turin, Italy).

AFFILIATIONS

Past President, Society of Women Engineers (U.S.). Member, American Management Association, Aircraft Owners and-Pilots Association, American Legion.

EDUCATION

Public schools, - Parkersburg, W. Va. University of Wisconsin (electrical eng.).

ENGINEERING EXPERIENCE

The Boeing Company, Seattle, Wash., New Orleans, La., and Huntsville, Ala., since 1953 (design, systems engineering, and configuration management).

MILITARY EXPERIENCE

Chief Petty Officer (Training Devices Spec.), U.S. Naval Reserve. Active duty - 1942-1945 and 1951-1953. Ready Reserve -- 1948-1951 and 1953-1964.Retired 30 June 1964.

LISTED IN

Who's Who of American Women. Dictionary of International Biography (London). Apollo/Saturn Roll of Honor (Library of Congress, U. S.).

ABSTRACT

By dictionary definition, safety is a condition of being free of peril or risk to human life and property to a degree determined acceptable. It must be recognized that absolute safety is seldom possible, and the degree of acceptable peril or risk must be determined. A piece of equipment made specifically for a child's use obviously will have a much lower "degree of acceptable risk" than very specialized, expensive, scientific laboratory equipment to which access would be limited to highly trained adults.

The engineer must attack the basic causes of accidents -- not just provide make-shift methods of surviving a lack of safety. Management must pay more than lip service to safety awareness. Safety of the user must be considered in the design of all products: toys, fabrics and clothing, buildings, electrical appliances, and large commercial airplanes, to name only a few.

Training of the user is a necessary and functional part of safety, and regulatory mechanisms are also necessary. However, the basic need is for the engineer and scientist to be aware of the user, to be concerned for the user, to recognize the foibles of the user, and to then provide built-in safety for the user which cannot be inadvertently subverted. Underlying this basic need is the commitment of each engineer and scientist to a personal integrity which dictates safety for the user as a prime consideration.

T F 2

INDUSTRIAL HYGIENE - THE TOTAL WORK ENVIRONMENT

Industrial hygiene is recognized as the science and art devoted to identification, evaluation and control of environmental factors or stresses, arising in or from the workplace, which impair the health and wellbeing of human receptors within the industrial environment.

Occupational health is one of the oldest, yet one of the more forgotten facets of man's total environment. Interdisciplinary approaches by engineers, physicians and physical scientists are increasingly relevant, challenging and required.

Thousands of workers suffer from lung disease, cancer, and dermatitis, hearing loss or other preventable disabilities caused by exposure to such factors as particulates, gases, noise, radiation, heat and pressure. Definitive guides for the control of occupational exposures to such health hazards need to be more fully developed and applied.

Engineers must become oriented to man in his total environment and develop a dynamic concept of the interdependence of health and workplace. They must work toward quantitative criteria for acceptable exposure response relationships as well as systematic methods for prevention and control.

Technical and managerial personnel must be made aware of the impact of modern technology on the workplace environment as well as on the entire industrialized society in which we live. There is a need for some degree of industrial hygiene supervision in almost every industrial area.

Miss Carolyn Phillips, PE
213 Bennett Avenue
New York, New York 10040 USA

Job: Senior Engineer
State of New York
Department of Labor
Division of Industrial Hygiene
New York, New York

Born: October 10, 1939 in NYC

Education:	Pratt Institute, NY	Bachelor of Mechanical Engineering, 1960
	New York University	Master of Civil Engineering, 1964
	New York University,	Institute of Environmental Medicine Currently pre-doctoral student for PhD.

Prior experience: 1960-62 Reactor Engineer
US Atomic Energy Commission, New York

Professional: Licensed as Professional Engineer, NY State in 1967

Secretary, 1970-71, Society of Women Engineers
Member, American Society of Mechanical Engineers
American Public Health Association (committee member)
American Conference of Governmental Industrial Hygienists

Hobbies: Sports (i.e. sailing, golf, canoeing, etc), reading

T F 3

NOISE, A PROBLEM OF COMFORT AND HEALTH

By Cesarina Bordone Sacerdote

Biography

Mrs. Cesarina Bordone Sacerdote was born in 1926 and got her Doctor degree in Electro technical Engineering in 1950. Since then, she has worked in the Acoustical Department of the Istituto Elettrotecnico Nazionale Galileo Ferraris, where she is now Chief of Section.

In 1961 she was fully licensed as lecturer of Applied Acoustics.

She has published number of papers on scientific reviews and taken part with contributions to several international congresses.

She is Secretary of a Working Group of International Electro technical Committee, in the Technical Committee for Acoustics and member of several technical societies.

Summary

The noise pollution should be known in order to be prevented. Methods of measurements have been developed to solve different problems, such as the noise of vehicles and aircrafts traffic: the data measured permit to foresee, the noise that will be produced under certain conditions and may help in chosing proper designs for new housing. Noises in work places can produce important desease, such as a gradual hearing loss: also in this case the collected data suggest better developments.

A quiet home has to be defended not only from external, but also from internal noises: the modern architectural acoustics .allows to design properly new dwellings, but efficient results will be reached only when a severe control will be compulsatory for the approval of any building.

POPULATION MODELING FOR THE ENGINEER

Martha E. Sloan
Instructor, Electrical Engineering Dept.
Michigan Technological University

Society is forcing the engineer to broaden his definition of engineering problems and solutions to consider the total environmental consequences of any engineering actions. One analytical viewpoint for engineering vs. environment problems is population analysis. Most significant problems involving quality of environment can be viewed by analyzing the effects of the proposed technological changes on the plant, animal, and human populations involved. The resulting mathematical analyses and simulation studies can then provide insights into the best way to treat the environment. This paper discusses several models of populations ranging from the simple exponential model to complex systems models and considers existing and potential applications.

Martha Sloan was born on 18 July 1939 in Aurora, Illinois, U. S. A. She received the B. S. degree in electrical engineering with Great Distinction from Stanford University in. 1961 and the M. S. degree in electrical engineering from Stanford in 1963. After graduating she worked for two years in communications research at Lockheed. She taught at the Frankfurt International School, Oberurse1, and Germany from 1965 to 1967 and received an M. S. degree in education from the University of Southern California in 1968. She has been an instructor in electrical engineering at Michigan Technologica1 University, Houghton, Michigan since 1969,

Mrs. Sloan is a member of Phi Beta Kappa, the Institute of Electrical and Electronic Engineers, the American Society for Engineering Education, and the Society of Women Engineers.

T F 5

A DURABLE ENVIRONMENT: ECOLOGY AND THE ENGINEER

By Martha E. Munzer

BIOGRAPHY

Martha E. Munzer, B.S. in Electrochemical Engineering, 1922 Massachusetts Institute of Technology.
Teacher of chemistry, Fieldston School, New York, N.Y. (1940-'54) Associate, The Conservation Foundation (1954-1968)
Associate, Wave Hill Center For Environmental Studies (1968
Author: For Teachers: "Teaching Science' Through Conservation"(with Dr. Paul Brandwein)
For Young People: "Unusual Careers," "Planning Our Town,"
"Pockets of Hope, "Valley of Vision - The Tva Years," in progress (with Helen Vogel) "Block by Block: The Rebuilding of a City."
Personal Biography: a son, twin daughters, seven grandchildren, one great-grandchild. (So farl)

SUMMARY

The engineer has been a key figure in building today's world. Wherever we look we see his or her handiwork. In earlier days, the black smoke belching from the stack of a factory was the sign of a humming economy. Little thought was given to the smoke as danger signal, as fore warner of what we were doing to poison our environment.

Engineers in the not too distant past were given no basic knowledge of ecology at even the best of engineering schools. The time has passed for such negligence. There are today far too many instances of engineering disaster - the direct result of the violation of fundamental ecological principles.

On the positive side, there are outstanding examples of success. These have been the direct result of a new kind of team planning in which the ecologist and other specialists have cooperated with the planner and the engineer.

But it isnt't up to the specialists only. You and I, as ordinary citizens, will also need to make some crucial decisions I How seriously do we take the warnings of the environmentalists? What are we willing to give up to achieve a cleaner world? Finally, are we prepared and willing to shoulder the costs?

T F 6

HYGIENE OF FEMALE LABOUR AND SCIENTIFIC AND TECHNICAL PROGRESS

By Anastasia Pavlovna Shitskova

Biography

Doctor of Medical Sciences, Professor, Director of the Moscow Scientific-Research Institute of Hygiene named after F.F. Erisman, Member of the Soviet Women's Committee.

Summary

Female labour is considered by the author as an important socio-economic and socio-hygienic problem to which the Spviet government bas always given much attention and continues to do so.

At the percent stage the problem of the hygiene of female labour is closely linked with scientific-technical progress. The scientific technical transformation in all the branches of the nation economy of the USSR; on the one hand, leads to widening the sphere of utilizing female labour, while on the other, new problems arise as a result of it. In connection with this the author poses the question of the necessity of serious scientific investigation into the character of the influence the new substances introduced into industry and. agricu1ture have on a person, the Safety, of working with them, and also elimination of these unfavourable factors on a person in connection with the introduction of complex mechanization and automation of industry.

..

Further, the author speaks of how the system of scientific activities in the sphere of hygiene of labour is placed in the USSR and goes into detail about the work of one of the major scientific research institutes of Hygiene - the Moscow Scientific-Research Institute: of Hygiene named after F. F. Erisman, of which she is the' director.

S A 2

EDUCATIONAL DEVELOPMENTS IN SCIENCE AND ENGINEERING AND THEIR INFLUENCE ON OPPORTUNITIES FOR WOMEN

Daphne F. Jackson, D. Sc., F.Inst.P. A.R.C.S.
Professor of Physics and Head of the Physics Department
Of the University of Surrey, Guilford, England.

Biography

Born 1936. Educated at the University of London. Lecturer at Battersea College of Technology, London, 1960- 1966. Reader in Nuclear Physics at the University of Surrey 1967-1970. Professor of Physics and Head of the Physics Department of the University of Surrey since 1971. Member of the Women's E Engineering Society since 1966. Author of over 40 papers and two books.

Summary of paper

Significant recent developments in the teaching of science and engineering at school and university level will be reviewed. The most important of these developments in schools appear to be curriculum development and use of applied projects. At the university1evel the increasing emphasis on interdisciplinary courses and continuous assessment is having a significant effect. The revision of teaching methods in science and engineering is occurring in many countries and is intended to change the image of science and science teaching. It will be argued that not all these de~ ve10pments will necessarily improve opportunities for women.

The relation between these educational developments and the employment prospects for young scientists will also be discussed since the apparent overproduction of scientists, particularly at Ph.D level, is becoming a serious problem and may well retard the progress of women in these fields.

S A 4

CONTEMPORARY EDUCATION OF WOMEN IN THE UNITED STATES

Lillian G. Murad - Bablanian

Biography.

During the past thirteen years, the author has been a science educator in Central School District #6, Oyster Bay, New York. Prior to this, she worked in the field of textile printing and textile chemical auxiliaries. Her water-base pigment binders, developed in 1949, are presently being used throughout the textile printing industry.

A holder of a BChE from Pratt Institute and a masters degree in education, she is also a graduate of the Conservatory of Music of Nice. Recipient of Pratt Institutels Chemical Engineering Alumni Award, member of Tau Beta Pi, second President of S. W. E., she was recently honored as an "Outstanding Teacher" by C. W. Post College, Long Island University.

Author of published works on ancient mathematicians and physicians, the theatre, and the dance, she is presently writing on education in ancient Sumer.

Summary

Although women constitute fifty-one percent of the population of the United States, there has been a decrease of degrees granted to women during the last two decades.

To explain this downward trend, psychological and cultural controls and attitudes, books, high-school curriculums, college admission and area of study, continued higher education, and opportunity for professional advancement for women are examined.

It is found that women, controlled by traditionally oriented expectations and curriculum, are not free to choose their potential by exploring a wide range of possibilities. Because of cultural and economic restrictions, lack of continued intellectual enrichment and stimulation, she loses the opportunity of developing personal and professional identity that would commit her strongly to her studies and her work.

It is suggested that to reach equality in education, society must be intellectually ready to accept ideological and cultural changes.

S A 6

THE ROLE OF WOMEN ENGINEERS AND SCIENTISTS IN A DEVELOPING NATION LIKE NIGERIA

By

Deborah Enilo Ajakaiye B.Sc., M.Sc., Ph.D., A.Inst.P

Lecturer, Department of Physics at the Ahmadu Bello University, ZARIA, NIGERIA.

Graduated B.Sc. Special Physics (London) in 1962 and M.Sc. Applied Geophysics at the University of Birmingham, England in October 1964. Returned to Nigeria later that year to take up a lectureship in the Department of Physics and Geology at the University of Ibadan. Joined the staff of the Department of Physics at the Ahmadu Bello University in August 1965 was on study leave from July 1968 to May 1969 at the Dominion Observatory, Ottawa, Canada reducing and Interpreting gravity data collected over an area of some 22,000 Km^2 in Nigeria. Has published a few paper's on gravity measurements in tribe de. Which is also the subject of a doctorate thesis submitted to the Ahmadu Bello University in August 1970?

Summary

Modern Science and Technology is slowly making an impact on Nigeria the largest populated country in Africa. The efficacy at Science and Technology in a developing nation is the acceptance of change. The scope of this change raises a number of problems and the role of Nigerian women Engineers and Scientists in carrying this charge into effect is examined and discussed in this paper. In Nigeria only about ten per cent of the total number of Engineers and Scientists are women opportunities for access of women to education in general and the fact that in the few existing girls secondary schools there are not enough qualified science teachers and adequate facilities contribute significantly to the relatively few number of women Engineers and Scientists in Nigeria. Due to a shortage or man power in scientific and. technological fields, the women are given equal opportunities in employment as their male counterparts and can therefore unobtrusively participate in the various development projects, in addition to their essential role in the family and. in society.

SA7

PROBLEMS DUE TO EVER INCREASING MASS PARTCIPATION OF WOMEN IN SCIENCE, TECHNIC AND PRODUCTION PROCESS IN THE SOCIALIST COUNTRIES AND IT' S INFLUENCE ON THE WOMEN'S POSITION IN THE WORLD

By Věra Preiningerová

Curriculum vitae

The author graduated from the Faculty of Electrical Engineering at the Technical University in Plzeň. After graduation she was engaged for over a year in the design of electric machines at the ČKD factory in Prague. After that she started work as a research student at the Research Institute of Heavy Current Engineering at Běchovice near Prague. In 1962 she obtained her higher scientific degree in the field of heat analyses and cooling of electric machines. For a period of another four year she did research work in the same sphere. In the past years she has been working in the field of 'degradation physics.

Summary

The subject of the article is the standing of a working woman in manufacturing, science and technology - its hystory and the different features of the situation of women in different countries. Further problems related to the increasing mass participation of women in production, science and technology in the socialist countries are discussed, problems that arise, for the whole community and for the women themselves, the possibilities and difficulties of their solution, proposals for necessary changes of a social and economic nature and, finally, the advantages resulting for women from the new situation.

S B 1

THE PROBLEM OF PART-TIME WORKING IN THE FIELD OF ENGINEERING

Biographie

Frau Dipl.Ing. Berger is a test engineer in the chemical engineering department of the Badische Anilin- & Sodafaprik, Ludwigshafen, Germany.

After matriculation in 1943, employed as a technical arithmetician in the aircraft industry. 1945 elementary school teacher. 1949 trained at the Musikpadagogische Fachschule, Erfurt. 1952 - 1957 studied at the Technische Hochschule, Dresden - subjects mechanical engineering and engineering teaching. Employed in industry since 1958.

Brief Summary

The Association of German Engineers (VDI) is engaged in trying to attract girls into the engineering profession, and in breaking down prejudices.

The VDI committee on 'Women in the Engineering Profession' is working out recommendations on the best method of combining the duties of the professional woman with those of the family woman. The basis of their present discussions is part-time employment. Representatives of the Federal German Labour Ministry, industry and trades unions are working together on this subject.

The 'Mirdal-Klein' three-phase theory is too inadequate for technical profession application. In view of the rapid advances made in industry and the natural sciences, a break of 10 to 15 years would appear to present too many problems. Part-time work would be a good way of bridging the second phase and of keeping abreast of technical developments.

According to the statistics, there is a general growing interest in part-time work, and enough positions are available in the 'typical female professions'. However, the pertinent requirements for the technical professions are less favourable for the female, and development in this respect is hampered by prejudices. Only under boom conditions has part-time working any chance of success, as employers would then also try to offer suitable working conditions to women in industry.

An experiment is under way: a large industrial concern is to cooperate with local school authorities to find practical ways of combining part-time working with all day schooling.

S C 1

TITLE OF PAPER: "The Evolution of Women's Role in the United States"

AUTHOR'S NAME: Evelyn Harrison

BIOGRAPHY: Miss Evelyn Harrison is Deputy Director, Bureau of Policies-and Standards, U.S. Civil Service Commission, concerned with legislation and policies governing 2,500,000 federal employees and job standards and tests covering their occupations at all levels. She is a graduate in civil Engineering from the University of Maryland; she began her career as a draftsman with the Geological Survey and transferred to the U.S.Civil Service Commission as an examiner in engineering and allied fields.

She has served on numerous Boards, Commissions, and Committees, including the President's Commission on the Status of Women, the District of Columbia Commission on the Status of Women, and the Women's Advisory Council on Poverty. She was Director of the Federal, Women’ s Program to provide equal opportunity/for women in the Federal, Government in hiring, promotion, and training, 1964-1969.

She is the author of a number of articles about the employment of women in the United States. She is a recipient of the Federal Woman's Award to outstanding career women in Government.

SUMMARY OF PAPER: During the past 100 years the transition of American society from a predominantly agricultural one to a highly industrialized urban one has effected major changes in the role of women in the United States. From an almost entirely family-serviced oriented role with legal status somewhere between a chattel and a minor, the American woman has emerged today in the role of a participating member in all aspects of American life. Full participation has not yet been acquired; many discriminations and inequities still exist. However, her movement into the labor force in the millions over the years, her deep in evolvement with volunteer activities of broad citizen and cultural concern, and concerted efforts for civil and political rights have freed-her from-many past legal, economic, and social restrictions. Today there is a new wave of feminism sweeping the country, motivated in part by the climate of dissent and disaffection of youth and minority ethnic groups with the country's institutional and societal structure.

S C 2

WOMEN'S ROLE IN INDIAN SOCIETY

By K. P. Suleebka.

Biography:

The author graduated in Electrical Engineering from the University of Bombay in 1963 and was Assistant Lecturer in Electronics oat Women's Polytechnic, Delhi till 1966. She then joined High Voltage Laboratory of the Indian Institute of Science, Bangalore for research and got her Master's Degree in 1971. She is currently working for Ph.D. degree at the same Institute. She presented her paper entitled "Social and Educational Attitudes of Women in Professional Engineering with particular reference to Indian environments", at SICWES.

Summary:

The literature and civilisation on the Indian sub-continent are approximately 6000 years old. In the earliest period of Indian civilisation - 6000 years ago - women were participating in every sphere of domestic and social activity. That was the golden age of civilisation when people were happy and prosperous. Women were gradually denied that role by a natural social change from about 4000 BC to 400 BC, and subsequently by a changed political situation - up to the end of 19th century. Finally, the status of women became that of a slave with the consequence that Indian civilisation itself suffered a down fall.

The 20th century showed new light to women. As soon as India got independence from foreign rule in 1947, the Parliament of India safeguarded Women's rights by passing various bills, according to which women are recognised as full members of the society and given equal rights with men. With the judiciary on their side, women now have started playing their proper human roles. Consequently they have not only to share half the burden of a homemaker along with their husbands, but also share all other Social, Economic and Political responsibilities.

S C 3

QUELQUES ASPECTS DES FEN1TES INGENIEURS PORTUGAISES

Par

Antera Valeriana de Seabra, mariée Geada.

Licenciée-es-Science (1943) par l' Ecole Poly technique et diplomée en Génie Chimiste par l' Institut Supérieur Technique (1946) de Lis bonnet
Assistante á la Faculté de Sciences pendant deux années; est entrée comme attachée au "Laboratorio de Engenharia Civil" en 1948; chargée de recherche du cadre (1955); Chef de Division (1958) et maltre de recherche (1968) aprés avoir soutenu une thése sur l' influence de la microstructure sur la relaxation des aciers á haute résistance.
Présidente du "Groupe d' études des Sujets Féminins" au sein de l'ordem.dos Engenheiros" dépuis1969.

Maria Luisa Jalhay, mariee Febrer.

Diplomée en Genie Chimiste par l' Institut Supérieur Technique" de Lisbonne en 1947.A été quatre années dans l' industrie privée; est entrée á la direction du "Laboratoire de Chimie (Service d'Etudes et d'Analyses de Produits Chimiques Industriels) dépuis 1961, pour 1a "Comissão Reguladora dos Produtos Ouimicos e Farmaceuticos."

Maria Amélia Fragoso, mariée Ferreira

Diplomée par l' Institut Supérieur d' Agronomie de Lisbonne (1958) Specialisée en spectrographie par le "Sir John Cass College" de Londres et par le "Macaulay Institute for Soil Research" de Aberdeen. Entreé en 1959 au "Laboratorio de Quí mica Agrlcola" oú elle est actuellement Chef de Travaux; attachée á la direction du "La boratorio de Análises de Plantas do Ultramar". Membre de la Délegation portugaise de la "Société Internationale de la Science du Sol". A effectué des études sur oligoélements des sols et des plan test

Résumé de la communication

Le but de cette communication est de faire connaitre différents aspects de Ia femme ingénieur au Portugal, soit du point de vue de la formation scolaire, soit de sa vie familiére. On donne aussi quelquer renseignements sur les possibilités a' études aux nlveaux moyens et universitaires - les memes que pour les garcons - aussi que des éléments statistiques concernants le % de filles diplomées par rapport au total de la population étudiante.
Dans la vie professionnelle il n'y a pas théoriquement aucun empêchement pour des emplois, mais, en réalité, les usines, en général privées, n'acoeptent des ingénieurs femmes que pour les laboratoires de controle et de recherche.
A la fin sont analisées les conditions familiéres, économiques, sociales et les possibilités actuelles au Portugal de maintenir un travail hors de Ia maison et une vie de famille; des données statistiques sont presentees.

S C 5

PRESENT AND FUTURE OF THE MEXICAN WOMAN

By: Angelina Perez Lopez

* * * * *

BIOGRAPHY:

The author is a graduated civil Engineer and bachelor in Psychology. She started studying Engineering, in her last year of college she began to work in the design of water supply systems. After graduation she got married leaving the professional activities for several years. After this time she went back to work and she start to study Psychology. During this period she worked half time in the design of hydro electric power plants. After graduation of bachelor, she founded and directed a firm dedicated to civil constructions. Since that time she is teaching at the University.

She has always been interested in the women's promotion and the problems they face in work and in social life.

SUMMARY:

A revision of the women's role from the last century to our time. Analising the influence of the past two world wars and the changes that are taking place in the women's role due to the evolution of social rights and to the access to highest educational level. Some groups are taking conscience of their responsibility of guiding other women to reach equal rights and opportunities

The author is aware that cooperation between sexes is the way to mankind's peace and happiness.

S C 7

THE SOCIAL ROLE OF THE WORKING WOMAN

by Zoya Alekseyevna Yarucova

Biography

Candidate of Historical Sciences, sociologist, senior scientific worker at the Scientific-Research Institute of the USSR Academy of Sciences, Member of the Soviet Women's Committee.

Summary

The report poses the question of what her social relations; her active participation in all spheres of the life of society has on the forming of a woman's all-round development as an individual. Special attention is paid to woman's participation in social production. In this connection the author speaks of the results of the socio-economic; policy of the Soviet Government, directed towards drawing women into social production. The report gives a picture of female labour in the USSR, its structure; special attention is paid on the quantitative changes an the utilization of female labour which has great significance when characterizing the social role of women. The question of women's new role in the family which is in full accord with her modern role is examined. Further, the author shows the role the Soviet Government plays in the creation of conditions that allow women to combine their role as a working woman, mother and citizen; in this connection she speaks of the new perspectives which open up before the Soviet women in the Ninth Five-Year Plan of the development of the national economy of the USSR.

SD1

EQUAL OPPORTUNITY - A FACT OF LIFE

By
Ruth I. Shafer
B.A., SWE, ASME, WES

Ruth I. Shafer was graduated from the University of Wisconsin in 1934. She has been active in the heating, ventilating and air conditioning field since 1941. In 1951-'52, she was Eastern Division Manager of OverHead Heaters, Inc. In 1953, she formed OverHead Heaters New York, Inc., franchised to sell several specialty heating products for commercial and industrial use. To this, she added her own brand-name equipment and accessories - Risco. In 1957, she joined the staff of the ventilation and air conditioning section of Gibbs & Cox, Inc., naval architects and engineers, as a design engineer.

She was Operations Chairman of The First International Conference of Women Engineers and Scientists held in New York in 1964. She is listed in "Who's Who of American Women."

Summary

This paper will attempt to show:

The position of professional and business women in the United States today.

Some causes for inequality, where it exists.

The position of women in engineering and science as opposed to women employed in other capacities.

The advantages of being a woman on these jobs.

Some suggestions for making working equality truly a fact of life.

S D 2

WOMEN AS A MINORITY GROUP - COMPARISON BETWEEN THE U.S.A. AND U.K., PAST, PRESENT AND FUTURE

Evelyn M. E. Murro, -Lenthall, B. Sc., L. Inst. P.

Resume

First-girl Special Trainee at Marconi Wireless and Telegraph Company, Chelmsford, England, and whilst there passed the Ordinary National Certificate in Applied Physics. Graduated in Physics and Mathematics from tale University of Southampton, England, in 1963. Worked on the early experiments Hi the Q-switching of ruby lasers using organic dyes at Technical operations, Inc., Burlington, Massachusetts; then on methods of testing lens systems using Microdensitometry at Itek Corp., Lexington, Massachusetts. At present, employed by Philco-Ford as a Senior Engineer (specialty Microdensitometry) on the PRESS Program at the M.I.T. Lincoln Laboratory, Lexington, Massachusetts.

Abstract

Women historically have accepted their role as, second class citizens. The two world wars brought a change. Many women took on the heavy responsibilities of both home and job. This has led to a wider acceptance of career women up to the point of starting a family. From the reon, society exerts heavy pressures on working mothers. It neglects to even consider the many women who as heads of households support their families by working.

There is a great need to ensure equal pay for equal work in Britain. Discrimination on the basis of sex is forbidden by law in the U. S. but exists in subtle forms. The inequities of the tax structure for married women working in Britain should be changed. Some legislation is forthcoming: California's community property laws, the revision of abortion, birth control and divorce statutes, are all in the right direction. For the future, child-care centers should be available nationally and universities and technical colleges should plan more refresher courses. More evening-shift work for women, part-time options for all without penalties, here the trade unions could help, and the Equal Rights Amendment to the U. S. Constitution should be passed. These changes can be brought about by people using the enormous power they have to see that the necessary laws are passed and implemented.

S D 3

UNITED STATES FEDERAL GOVERNMENT
EQUAL OPPORTUNITY FACTS AND FICTION

RENEE R. STONE

TITLE - Project Engineer, Research & Development; and Equal Employment Opportunity Examiner, Picatinny Arsenal, Dover, N.J.

PRINCIPAL DUTIES AND RESPONSIBILITIES - Technical direction and program management in research & development of defense items. Examiner of Equal Employment Opportunity Grievances, training of management in Equal Opportunity Programs. .

EDUCATION -Bachelor of Aeronautical Engineering, New York University, 1946. .Graduate work in Industrial Engineering, New York University, 1946 - 1948 and at Stevens Institute in Ordnance Engineering, 1965 - 1966. Courses in Production. Management, Technical Personnel Management, Management Communication and Discrimination Complaint Examiner, 1964 - 1970.

AWARDS AND HONORS - Who is Who in American Women, 1965; Zero Defects Award, Picatinny Arsenal, 1965; Letter of Commendation, Picatinny Arsenal, 1966.

AFFILIATIONS - Society of Women Engineers, Armed Forces Management Association, and Morris County Engineers.

PERSONAL - Married, four children, active member of the Experiment in International Living, active in religious & educational organizations.

ABSTRACT

THE PAST - Women have been employed in the Federal Government for almost 200 years. A woman postmaster was appointed in 1773. Years later the Civil Service Act of 1883 permitted and even encouraged women to compete in Examinations on the same basis as men. In 1864, a maximum of $600 a year for female clerks was established; male clerks were receiving $1200 - $1800.

THE PRESENT - Executive Order 11375 banning sex discrimination of 1967, reinforces the intent of Executive Order 11246, which had prohibited discrimination in federal employment. Because of race, color, religion or national origin.

Primary program efforts have been directed toward three main objectives:

(1) Creating the legal, regulatory and administrative frame work for achieving equality of opportunity without regard to sex; (2) Bringing practice in closer accord with merit principles through elimination of attitudes, customs and habits which have previously denied women entry into certain occupations; and
(3) Encouraging qualified women to compete in examinations for federal employment and to participate in training programs leading to advancement.

THE FUTURE - Increasing the understanding at all management levels of the economic advantages of fully utilizing the talent and ability of female employees.

Promoting public awareness of Federal Government opportunities by encouraging women to prepare for all occupations, publicizing achievements of women in top-level positions, and building rapport with community organizations and other groups. Developing job design and employment practices which are better suited to women's life styles, such as more part-time employment, maternity leave benefits, and federally sponsored day-care centers. Increasing training and motivation of women through early guidance on occupational choices, Job counseling, improved management training and utilization.

SD4

TOWARD EQUAL OPPORTUNITIES - HUNGARIAN WOMEN ENGINEERS

By Zsuzsa Szentgyörgyi

Biography

The author graduated at the Technical University of Budapest in 1956. After graduation she was active as a designer and worked out several industrial devices for automatic control, then she joined the staff of the Research Institute for Automation of the Hungarian Academy of Sciences. At present Miss Szentgy6rgyi is working on her post-graduate work.

Her specialized interest is in the field of computing techniques and she deals with software problems /programming languages! of computers. She has written several scientific papers and some papers on the role of Hungarian Women Engineers. She is a member of several scientific societies and is on the editorial boards of a journal on automatic control.

Summary

The social transformation taking place after the Second World War conferred by law full equality of rights on Hungarian women and opened up possibilities for them to continue their studies on any university. They were free to enter technical professions that had been completely barred to them before. However, in so short a time it has been impossible to achieve fully equal rights in practice.

The Organization of Hungarian women Engineers and scientists/ the MENKO/ has carried out fact-finding investigations among women with technical degrees. The present paper discusses the preparation of these investigations, the compilation of the. Questionnaire and the evaluation based on the answers received. Finally, it draws general consequence' s concerning the further tasks to be done.

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S D 6

THE WOMAN ENGINEER IN ARGENTINA

By Tania P. de Cano

BIOGRAPHY

Born in Buenos Aires, Argentina, in 1925; married, two sons. Mrs. Tania patlis de Cano is a woman Civil Engineer who has completed her University studies in the Faculty of Engineering of the University of Buenos Aires, in 1953,

She worked from 1948 to 1960 in the National Highway Bureau as designer, and from 1958 in the Faculty of Engineering of the University of Buenos Aires, At present she is Academic Pro Secretary of said Faculty and Partner of "I.S.C. ", a consulting engineering firm.

-- SUMMARY --

It is evident that woman has a wide field of activity in Argentina, a country which is in the process of industrialization. Work has meant for woman the opening path from the strict family circle upon which argentine society is based.

By the turn of the nineteenth century the argentine woman begins to venture In the field of elementary education and by the middle of this century she became the principal element in elementary school and was at ready predominating in high school

In the university field, a three fourth of the student population are men and one fourth are women, Statistics show a considerable increase of female students during the recent years.

Unfortunately the lowest number of women university students is found in the Schools of Engineering,

Nevertheless, the Argentine Woman Engineer has struggled worthily in order to make her way in the profession, but she is still far from being able to attain the distinguished positions man has reached in the field of Engineering. .

It is evident that woman's potential capacity is equal to that of man, but the opportunities to exercise it are generally denied or not offered to her.

SD7

SYSTEMS ENGINEERING - THE FIELD FOR WOMEN?

AGNES A. KAPOSI. Dipl. Ing., C. Eng., M.I.E.E.

The author is a graduate of the Technical University of Budapest.

Her experience includes Industrial research and development in the British Electronic and Computer industries. She has worked as a lecturer since 1964 and is at present a member of the staff of the School of Electrical Engineering Kingston Polytechnic, G.B., engaged in teaching Electronic and Computer Engineering as well as conducting research concerning Computer- Aided Design. She is a partner of Polytechnic Consultants, a firm of engineering consultants.

Mrs. Kaposi is married to an engineer and has two daughters aged 10 and 7 years.

SUMMARY OF PAPER:

The failure of women to establish themselves in any great numbers in the engineering industries of Western countries is attributed to educational and social causes. Due to tradition and social pressures the technical skill of girls is not allowed to develop in the same way as that of boys and even those girls with aptitude are discouraged to take up careers in technology. The few who train as engineers find less than fair career prospects due to traditional attitudes in predominantly male institutions of industry or research.

It is proposed that the newly developing field of systems engineering provides the opportunities women have lacked so far. Systems engineering demands that engineers should possess mathematical aptitude rather than practical skills; the discipline is akin to mathematics and computing science - fields in which women have proven themselves have become accepted and have been working successfully over the years; it has not had time to establish restrictive staffing traditions and its expanding demands outstrip all supply, thus offering almost un-limited prospects to anyone with the right ability and training.

This paper will define systems engineering, discuss its function, significance and demands and argue the case for training women systems engineers.

S D 8

SIXTY YEARS IN MOTOR ENGINEERING

By Phil Deacon Reeves, M.B.E., F.I.M.I.,

Biography

Phil Deacon Reeves is F.I.M.I., Member of the Women's Engineering Society, Member of the Guild of Motoring Writers and Fellow of the Institute of the Motor Industry. She was 3/rd Officer W.R.N.S. 2 years broadcasting with Radio Seac. and Secretary of the British European Association of Ceylon.

Mrs. Reeves is First Secretary of Ceylon Road Federation and First Secretary and joint Founder of the Ceylon Society for Prevention of Accidents.

Summary

The 'Sixty' is possibly a misnomer but I was born into the Motor Trade and from the age of two crawled around my 'Father's Motor Engineering Shop to the dispare of my mother!

Learned to drive inside the works from the age of seven. Cars had starting handles as part of their equipment. Allowed to use starter only at the beginning of journey - engine stalled handle must be used.

Studied Mechanical Drawing at school instead of freehand. Left school and joined Father. Studied for the Institute of Motor Industry Examination and was first woman to' pass. Visited Works - Met such people as Seagrave, Malcolm Campbell kaye Don and Parry Thomas - anecdotes of these.

Took up writing for the Motor Trade papers.

Driver in the W.R.N.S. Flag Officer Ceylon's Transport Officer. Motoring Correspondent for Times of Ceylon.

The above outline - when expanded - will include notes of how cars have improved or deteriorated! , New view of Women in Motor Engineering etc.

S C 2

WOMEN'S ROLE IN INDIAN SOC IETY

By K. P. Suleebka.

Biography:

The author graduated in Electrical Engineering from the University of Bombay in 1963 and was Assistant Lecturer in Electronics at Women's Polytechnic, Delhi till 1966. She then joined High Voltage Laboratory of the Indian Institute of Science, Bangalore for research and got her Master's Degree in 1971. She is currently working for Ph.D. degree at the same Institute. She presented her paper entitled "Social and Educational Attitudes of Women in Professional Engineering with particular reference to Indian environments", at SICWES.

Summary:

The literature and civilisation on the Indian sub-continent are approximately 6000 years old. In the earliest period of Indian civilisation - 6000 years ago - women were participating in every sphere of domestic and social activity. That was the golden age of eiyilisat10n when people were happy and prosperous. Women were gradually denied that role by a natural social change from about 4000 BC to 400 BC, and subsequently, by a changed political situation – up to the end of 19th century. Finally, the status of women became that of a slave with the consequence that Indian eivilisat10n itself suffered a down fall.

The 20th century showed new light to women. As soon as India got independence from foreign rule in 1947, the Parliament of India safeguarded women's rights by passing various bills, according to which women are recognised as full members of the society and given equal rights with men. With the judiciary on their side, women now have started playing their proper human roles. Consequently they have not only to share half the burden of a homemaker along with their husbands, but also share .all other Social, Economic and Political responsibilities.

WOMEN' S ROLE IN INDIAN SOCIETY

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I. Introduction

In any social set-up, apart from the inevitable biological role of begetting children for the propagation of human race, women must playa fuller role as members of society. Whenever they were denied the latter role, civ1lisation was in trouble.

The following study of the evolution of the role of women in Indian society provides us with a striking example of the part played by this half of humanity in the rise and fall of a civilisation.

In the earliest period of Indian civilisation 6000 years ago, women were participating in every sphere of domestic and social activity. This was the golden age of Indian civilisation when people were prosperous and happy. Women were gradually denied this role by a natural social change from about 6000 BC to about 400 BC and subsequently by a changed political situation upto the end of the 19th century. Finally the status of women became that of a slave, with the consequence that Indian civilisation itself suffered a downfall. At this juncture the Indian people reviewed their condition – a normally and spiritually polluted society, the masses dying of hunger and disease and the country a mere colony of the British. Indians saw the danger of the extinction of their civilisation and men and women both awoke to the call of their duty. Today, Indian men and women are together struggling to get back the glory of the ancient Indian civilisation gauged in modern measures. Thus we find that the role of women and the rise and fall of Indian civilisation are linked closely. In fact the status of women in a society can be taken as a rough index of the degree of civilisation of that society.

II. Womens' Role In Ancient Indian Society: (4000 BC - 400 BC)

The earliest human race is conjectured to have lived in a state of promiscuity, where individual marriages did not exist, where all men in a horde or tribe had indiscriminate access to all the women and where the children born of these unions belonged to the community at large. It is hard to conceive any other role for women in such a society, except the job of bearing children. In Indian society also such a thing seems to have existed till it was prevented by a sage named Shwetaketu, who was shocked beyond measure to find his own mother going out with a stranger in the presence, and with the full approval of his own father.

The subsequent history of the Indian civilisation can be traced back to 4000 BO on the basis of the remanent archeological evidences and the Hindu law-books. The earliest book

Is the Rig Veda*, which is the most important source of information about all aspects of life in those days. The society was based on a patriarchal system, but women were considered equal to men and, thus, they participated in every activity of life.

The study of the Vedas was the only education in those days. Girls, along with boys, were introduced to Vedic studies at the age of about 8 years. They pursued their studies till they got married - at the age of about 16-18 years. Some girls remained unmarried and persued their studies throughout their lives - they not only became Vedic scholars, but also great philosophers, debators and teachers. Indeed some of the Vedic poems themselves were composed by women.

The choice of a suitable husband was made by the parents. This seemed to be the rule for most part of the Vedic age. However, we are told in Atharva Samhita** that 'by Vedic studentship, a girl wins a young husband.' Anyway, after marriage, a girl had to leave her parents and enter her husband's house as its queen. She was considered bringer of blessings not only to the human beings, but also to the animals and birds of her husband's house. She was not only his companion in weal and woe, but a real partner in all his activities, including religious sacrifices. The Vedic word 'Dampate' used to denote jointly the husband and wife, etymo-logically means the joint owners of the house. The union of wife and husband both in body and mind is repeatedly emphasized in the Vedas. The poems hold out before us the pleasant picture *of* a happy home, where husband and wife, faithful to each other, pass their lives in peace and prosperity, and spend their well-earned rest in old age amidst sons and grandsons the daughters would, of course, have left the house after marriage.

The idea of conjugal fidelity on the part of the wife and the conception of physical chastity of women were very different from those of the later days, but, on the whole, same standards were adopted in judging both males and females. Widows were certainly allowed to remarry, but even apart from this, their union with other men was tolerated and even sanctioned, at least under special circumstances. It appears that after the death of a husband, the wife lying by the side of the dead body on the funeral ground, was raised by his brother and led back home to become his wife.

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They were manufacturing bows and arrows, making baskets, weaving cloth and participating in outdoor agricultural works*. It is important to note that words like 'female arrow makers' do not occur in later literature. Since women were following many outdoor professions, there was naturally no 'Purdah' (Veil) for them. Among the fine arts, music and dancing appear to have been created and performed by women, fairly extensively. Women as rulers and political officers do not figure in the early Vedic times.

Thus, we see that the general position and status of Indian women in the early Vedic age was much higher than that in any other ancient society that we know of: those of Greece and Rome not excluded. It is hardly necessary to point out that the picture is an ideal one. In actual life, the authority of the husband prevailed over the wife in many eases. Nevertheless, women had an important role in all the spheres - domestic, educational, social, religious and professional.

III. Women's Role In The Later Period: (400 BC - end of 19th century)

During these thousands of year, it is inevitable that the status of women too would have undergone many changes. But it is remarkable that, from every point of view, there was a steady process of decline.

The turning point in women's fuller participation was a social change towards the end of the Vedic age. There was a growing opinion in favour of the early marriage of girls. The main idea was to preserve physical purity, since it was contended that one should select a girl who should not even have dreamt of sexual love. The idea was gradually pushed to its logical conclusions and marriage before puberty came to be the general rule. Even infant marriages came into vogue. The consequences of such asocial change were very grave.

Girls married at an early age, could scarcely have received any education beyond the elementary stage. And as marriage came to be regarded as obligatory, they had no opportunity to lead a student's life. They were gradually deprived of higher learning, particularly of Vedic studies. A lack of knowledge of the Vedas made them unfit to perform religious sacrifices and various sacraments (samskaras). Hence we find that these samskaras, which were performed alike for boys and girls in the early Vedic period, were, at first, performed for girls without the Vedic mantras and then came to be stepped altogether. Vedic studies having been stopped, women lost the status of Dwija or twice born and came to be regarded by men as equal to the lowest caste, Shudras. In course of time, they were, like Shudras, declared unfit for reciting or even listening to Vedic poems. In Gita, we are told

* The Aryans, at this time, were engaged in the arduous task of political expansion.

That 'even those who are born sinners, as well as women, Vaishyas* and Shuaras may obtain salvation by devotion to the Lord, what to speak of Brahmans and Kshatriyas'. This inherent inferiority of women is also emphasized by the religious commentators who interpreted the Vedas and the later religious books, to justify this downfall of women. It was then natural to regard them as subjects as they were unfit to study the religious books and so would not know what is proper and what is not proper.

Still more illuminating are Shankara's comments upon a passage in Brihadaranyaka Upanishad**. It refers to a ritual to be performed by one who wishes to have a learned daughter (Pandita). Shankara says that Pandita here cannot mean 'learned' because Vedic study is denied to women; so it must be interpreted as skill in household management. The passage shows that earlier, women were entitled to Vedic studies and learned daughters were highly prized by the parents. It is within the memory of all that the erthodox hindu society regarded it as not only unbecoming but also inauspicious that women should be able to read or write.

The denial of education to women was the dental to them to play their proper roles. Who would come to the rescue of an illiterate, ignorant woman if the society was bent on snatching away all her rights? When she could not help herself, why should men help her? Manu Smriti** which guided the social system from 400 BC till today, starts with the fundamental principle that 'day and night, woman must be kept in dependence of the males. Her father protects her in childhood, her husband in youth and her sons in old age; a woman is never fit for independence' . Manu, however, goes one step further and regards women, by nature, as of such depraved character that they are sure to go astray if they are not kept under rigid control. Manu Smriti depicts the licentious and grossly sensual character of woman in general in such terms as cannot be reproduced without

* By this time society had been divided into four castes, on the basis of their profession. They are in the order of status;

1. Brahmanas - whose job was to study and teach Vedas, and lead the society on the path of religion? They would not bother about their livelihood; the society would look after them.
2. Kshatriyas - whose job after completion of studies, was to rule and defend the country.
3. Vaishyas - who went into the business profession after completing studies?
4. Shudras - who were not permitted to study any kind of literature, but their sale job was to serve the three upper classes.

** Religious Books.

Violating decency and modesty. The creator 'implanted in them carnal passions, love for ornaments, impure desires, wrath, dishonesty, malice and bad C0nduct'. 'Women who are destitute of strength and knowledge of Vedic texts, and for whom no sacramental rite is performed with sacred texts, are as impure as falsehood itself. In view of their inherent wicked character, they must be carefully guarded, specially by their husbands, to whom they are naturally disloyal'. The cardinal principle was that the wife should ever remain obedient to her husband, must never do anything that might displease him, be faithful to his memory after his death, should not think of any other man. Even though the husband be of bad character and seeks pleasure elsewhere, he must be worshipped as a God by a faithful wife. With such views written in religious books, the status of woman was naturally reduced to that of a slave who had to do everything to please her master.

It is hardly necessary to add that Manu was against levirate and remarriage of women. Life for a widow became more and more miserable. Her plight was worse than a Shudra. Perhaps, this unbearable life might have been the reason that some widows (in North India) would have opted to be burnt alive along with their husbands. Dead body. Such a. custom was soon sanctioned by the society and with time it became established. The reasoning behind it was that such a sacrifice on the part of the wife would secure a place in heaven for both the husband and the wife. Thus, those widows who did not want to be burnt alive were forcibly thrown into the funeral pyre. There are very pathetic accounts of this inhuman custom, named Sati, from 400 AD - 1860 AD.

Even Gautama Buddna was not wholly above this spirit. For a long time he refused to admit women to his religious order and when he did so, he prophesied that the purity of his religion would not endure for more than half the period that it would otherwise have done. He also imposed a far more rigorous test and placed the nuns as a class in a position of inferiority to the monks. These and other reasons must have produced the feeling that women were wicked and sensual by nature and must be constantly held in check by men. It should be remembered, however, that such a feeling was almost universally held throughout the world down to very recent times. Confueius, Aristotle, Milton and even Rousseau preached that women being inherently inferior to men should always remain in a subordinate position to them.

Women however had certain rights of inheritance of property throughout this period. These rights could be exercised only after the death of her husband. Whatever property, ornaments were gifted to her by her father at the time of her marriage would be returned to her after her husband's death. Buddhism gave her many more rights than the Hinduism. She was given freedom of choice of marriage, of divorce, of sharing the fruits of property, of inheriting property, of adopting children etc., in addition to considering her eligible to work independently for her own salvation. Only it placed her in an inferior position

To men in the religious heirarchy. Nevertheless, this concession by Buddhism influenced Hindu soc1ety and at certain times (Kautilyal' s Arthashastra) divorce could be obtained by mutual consent.

The most unfortunate influence of the Muslim culture on Hindu society was propagation of Purdah for women. Muslims after starting the conquest of Indian Territory in the 12th century began to settle down permanantly in their acquired lands. Purdah, which was already in vogue in the Royal Hindu families, was adopted by society to safeguard their women from the concupiscent eyes of the conquerors. This further decreased the already deminished chances of women getting any education*. The nation was divided into hundreds of small territories. Society followed hundreds of unreasonable and inhuman customs. The general character of the masses became degraded and so did the living standards.

The British could easily take over the whole of the Indian Territory during the 19th century. Their rule further complicated the whole matter. The native system of education for men also vanished. At the time Europe and America were passing through the industrial revolution, India could not even cope with its agriculture, let alone talking of industries. Poverty, ignorance, disease, a cripplied social system and foreign rule together pulled Indian civilisation down into the abyss of darkness.

The Western education, which was introduced by the British far production of clerks for their administration, however, brought the fresh air of modernism. The first realisation by the Indian people was that if they remained dependent on the British, the Indian e1vilisation would be wiped off the map of the world. Also they realised the necessity to revive the earlier standard of Indian c1vilisation. The leader of the nation, "Mahatma Gandhi, gave a call not only to the men of India to fight for independence, but to women also, to shed their ignorance and come in line with men for the service of the nation. It was his call for the civil disobedience movement that brought women out of their homes and reintroduced them to their forgotten roles. Women then started reviewing their position and once they shed their ignorance, they could see a clear path with the help of the light of education.

IV. Women's Role In Modern India:

Political independence was not enough to bring back the glory of ancient Indian civilisation, the standards of which had fallen so low that if they were not rescued they would disappear altogether. The position of women was to be upgraded before any other measure could be made effective.

The most important reasons for the downtrodden condition of women were;

i) forced illiteracy and lack of adequte education,
ii) Economic dependence, and
iii) Their own attitude towards themselves.

* By the beginning of the 19th century, hardly one woman in a hundred could read.

Social reformers and political leaders had already realised the importance of the emancipation of women. The Sati and similar customs were banned. The doors of the Universities and Legislatures were opened to women by the end of the 19th century. Women were granted a right to vote even before India got independence. But because of the foreign rule, poverty and illiteracy among the general public, not very much could be achieved before independence. After India became free, the Constitution of India barred any discremination on the basis of sex. Various laws passed subsequently by the Parliament, gave her equal rights regarding divorce, inheritance of property and adoption of children. The dowry system and polygamy were banned. The minimum age for marriage of girls was fixed at 18 years.

Education is the key to the problem of the emancipation of women. In free India, a greater number of girls are going to schools, colleges and universities, are getting employment in offices, industries and business, are helping to support their families, and are cultivating their long-lost self respect. Quantitatively, the progress in this direction is slow, but not at all discouraging. Today we have hundreds of women lawyers and engineers, thousands of doctors and scientists, perhaps millions of working women. We have several women members of Parliament, more than 100 of state Assemblies and Indira Gandhi.

Acknowledgements:

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S C 2

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II. Womens' Role In Ancient Indian Society: (4000 BC - 400 BC)

The earliest human race is conjectured to have lived in a state of promiscuity, where individual marriages did not exist, where all men in a horde or tribe had indiscriminate access to all the women and where the children born of these unions belonged to the community at large. It is hard to conceive any other role for women in such a society, except the job of bearing children. In Indian society also such a thing seems to have existed till it was prevented by a sage named Shwetaketu, who was shocked beyond measure to find his own mother going out with a stranger in the presence, and with the full approval of his own father.

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Thus, we see that the general position and status of Indian women in the early Vedic age was much higher than that in any other ancient society that we know of: those of Greece and Rome not excluded. It is hardly necessary to point out that the picture is an ideal one. In actual life, the authority of the husband prevailed over the wife in many eases. Nevertheless, women had an important role in all the spheres - domestic, educational, social, religious and professional.

III. Women's Role In The Later Period: (400 BC - end of 19th century)

During these thousands of year, it is inevitable that the status of women too would have undergone many changes. But it is remarkable that, from every point of view, there was a steady process of decline.

The turning point in women's fuller participation was a social change towards the end of the Vedic age. There was a growing opinion in favour of the early marriage of girls. The main idea was to preserve physical purity, since it was contended that one should select a girl who should not even have dreamt of sexual love. The idea was gradually pushed to its logical conclusions and marriage before puberty came to be the general rule. Even infant marriages came into vogue. The consequences of such asocial change were very grave.

Girls married at an early age, could scarcely have received any education beyond the elementary stage. And as marriage came to be regarded as obligatory, they had no opportunity to lead a student's life. They were gradually deprived of higher learning, particularly of Vedic studies. A lack of knowledge of the Vedas made them unfit to perform religious sacrifices and various sacraments (samskaras). Hence we find that these samskaras, which were performed alike for boys and girls in the early Vedic period, were, at first, performed for girls without the Vedic mantras and then came to be stepped altogether. Vedic studies having been stopped, women lost the status of Dwija or twice born and came to be regarded by men as equal to the lowest caste, Shudras. In course of time, they were, like Shudras, declared unfit for reciting or even listening to Vedic poems. In Gita, we are told

* The Aryans, at this time, were engaged in the arduous task of political expansion.

That 'even those who are born sinners, as well as women, Vaishyas* and Shuaras may obtain salvation by devotion to the Lord, what to speak of Brahmans and Kshatriyas'. This inherent inferiority of women is also emphasized by the religious commentators who interpreted the Vedas and the later religious books, to justify this downfall of women. It was then natural to regard them as subjects as they were unfit to study the religious books and so would not know what is proper and what is not proper.

Still more illuminating are Shankara's comments upon a passage in Brihadaranyaka Upanishad**. It refers to a ritual to be performed by one who wishes to have a learned daughter (Pandita). Shankara says that Pandita here cannot mean 'learned' because Vedic study is denied to women; so it must be interpreted as skill in household management. The passage shows that earlier, women were entitled to Vedic studies and learned daughters were highly prized by the parents. It is within the memory of all that the erthodox hindu society regarded it as not only unbecoming but also inauspicious that women should be able to read or write.

The denial of education to women was the dental to them to play their proper roles. Who would come to the rescue of an illiterate, ignorant woman if the society was bent on snatching away all her rights? When she could not help herself, why should men help her? Manu Smriti** which guided the social system from 400 BC till today, starts with the fundamental principle that 'day and night, woman must be kept in dependence of the males. Her father protects her in childhood, her husband in youth and her sons in old age; a woman is never fit for independence' . Manu, however, goes one step further and regards women, by nature, as of such depraved character that they are sure to go astray if they are not kept under rigid control. Manu Smriti depicts the licentious and grossly sensual character of woman in general in such terms as cannot be reproduced without

* By this time society had been divided into four castes, on the basis of their profession. They are in the order of status;

1. Brahmanas - whose job was to study and teach Vedas, and lead the society on the path of religion? They would not bother about their livelihood; the society would look after them.
2. Kshatriyas - whose job after completion of studies, was to rule and defend the country.
3. Vaishyas - who went into the business profession after completing studies?
4. Shudras - who were not permitted to study any kind of literature, but their sale job was to serve the three upper classes.

** Religious Books.

Violating decency and modesty. The creator 'implanted in them carnal passions, love for ornaments, impure desires, wrath, dishonesty, malice and bad C0nduct'. 'Women who are destitute of strength and knowledge of Vedic texts, and for whom no sacramental rite is performed with sacred texts, are as impure as falsehood itself. In view of their inherent wicked character, they must be carefully guarded, specially by their husbands, to whom they are naturally disloyal'. The cardinal principle was that the wife should ever remain obedient to her husband, must never do anything that might displease him, be faithful to his memory after his death, should not think of any other man. Even though the husband be of bad character and seeks pleasure elsewhere, he must be worshipped as a God by a faithful wife. With such views written in religious books, the status of woman was naturally reduced to that of a slave who had to do everything to please her master.

It is hardly necessary to add that Manu was against levirate and remarriage of women. Life for a widow became more and more miserable. Her plight was worse than a Shudra. Perhaps, this unbearable life might have been the reason that some widows (in North India) would have opted to be burnt alive along with their husbands. Dead body. Such a. custom was soon sanctioned by the society and with time it became established. The reasoning behind it was that such a sacrifice on the part of the wife would secure a place in heaven for both the husband and the wife. Thus, those widows who did not want to be burnt alive were forcibly thrown into the funeral pyre. There are very pathetic accounts of this inhuman custom, named Sati, from 400 AD - 1860 AD.

Even Gautama Buddna was not wholly above this spirit. For a long time he refused to admit women to his religious order and when he did so, he prophesied that the purity of his religion would not endure for more than half the period that it would otherwise have done. He also imposed a far more rigorous test and placed the nuns as a class in a position of inferiority to the monks. These and other reasons must have produced the feeling that women were wicked and sensual by nature and must be constantly held in check by men. It should be remembered, however, that such a feeling was almost universally held throughout the world down to very recent times. Confueius, Aristotle, Milton and even Rousseau preached that women being inherently inferior to men should always remain in a subordinate position to them.

Women however had certain rights of inheritance of property throughout this period. These rights could be exercised only after the death of her husband. Whatever property, ornaments were gifted to her by her father at the time of her marriage would be returned to her after her husband's death. Buddhism gave her many more rights than the Hinduism. She was given freedom of choice of marriage, of divorce, of sharing the fruits of property, of inheriting property, of adopting children etc., in addition to considering her eligible to work independently for her own salvation. Only it placed her in an inferior position

To men in the religious heirarchy. Nevertheless, this concession by Buddhism influenced Hindu soc1ety and at certain times (Kautilyal' s Arthashastra) divorce could be obtained by mutual consent.

The most unfortunate influence of the Muslim culture on Hindu society was propagation of Purdah for women. Muslims after starting the conquest of Indian Territory in the 12th century began to settle down permanantly in their acquired lands. Purdah, which was already in vogue in the Royal Hindu families, was adopted by society to safeguard their women from the concupiscent eyes of the conquerors. This further decreased the already deminished chances of women getting any education*. The nation was divided into hundreds of small territories. Society followed hundreds of unreasonable and inhuman customs. The general character of the masses became degraded and so did the living standards.

The British could easily take over the whole of the Indian Territory during the 19th century. Their rule further complicated the whole matter. The native system of education for men also vanished. At the time Europe and America were passing through the industrial revolution, India could not even cope with its agriculture, let alone talking of industries. Poverty, ignorance, disease, a cripplied social system and foreign rule together pulled Indian civilisation down into the abyss of darkness.

The Western education, which was introduced by the British far production of clerks for their administration, however, brought the fresh air of modernism. The first realisation by the Indian people was that if they remained dependent on the British, the Indian e1vilisation would be wiped off the map of the world. Also they realised the necessity to revive the earlier standard of Indian c1vilisation. The leader of the nation, "Mahatma Gandhi, gave a call not only to the men of India to fight for independence, but to women also, to shed their ignorance and come in line with men for the service of the nation. It was his call for the civil disobedience movement that brought women out of their homes and reintroduced them to their forgotten roles. Women then started reviewing their position and once they shed their ignorance, they could see a clear path with the help of the light of education.

IV. Women's Role In Modern India:

Political independence was not enough to bring back the glory of ancient Indian civilisation, the standards of which had fallen so low that if they were not rescued they would disappear altogether. The position of women was to be upgraded before any other measure could be made effective.

The most important reasons for the downtrodden condition of women were;

i) forced illiteracy and lack of adequte education,
ii) Economic dependence, and
iii) Their own attitude towards themselves.

* By the beginning of the 19th century, hardly one woman in a hundred could read.

Social reformers and political leaders had already realised the importance of the emancipation of women. The Sati and similar customs were banned. The doors of the Universities and Legislatures were opened to women by the end of the 19th century. Women were granted a right to vote even before India got independence. But because of the foreign rule, poverty and illiteracy among the general public, not very much could be achieved before independence. After India became free, the Constitution of India barred any discremination on the basis of sex. Various laws passed subsequently by the Parliament, gave her equal rights regarding divorce, inheritance of property and adoption of children. The dowry system and polygamy were banned. The minimum age for marriage of girls was fixed at 18 years.

Education is the key to the problem of the emancipation of women. In free India, a greater number of girls are going to schools, colleges and universities, are getting employment in offices, industries and business, are helping to support their families, and are cultivating their long-lost self respect. Quantitatively, the progress in this direction is slow, but not at all discouraging. Today we have hundreds of women lawyers and engineers, thousands of doctors and scientists, perhaps millions of working women. We have several women members of Parliament, more than 100 of state Assemblies and Indira Gandhi.

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THE ROLE OF WOMEN ENGINEERS AND SCIENTISTS IN A DEVELOPING NATION LIKE NIGERIA

By

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Summary

Modern Science and Technology is slowly making an impact on Nigeria the largest populated country in Africa. The efficacy of Science and Technology in a developing nation is the acceptance of change. The scope of this change raises a number of problems and the role of Nigerian women Engineers and Scientists in carrying this change into effect is examined and. discussed in this paper. In Nigeria only about ten per cent of the total number of Engineers and Scientists are women.Oppotunities for access of women to education in general and the fact that in the few existing girls secondary schools there are not enough qualified science teachers and adequate facilities contribute significantly to the relatively few number of women Engineers and Scientists in Nigeria. Due to a shortage of man power in scientific and technological fields, the women are given equal opportunities in employment as their male counterparts and can therefore unobtrusively participate in the various development projects, in addition to their essential role in the family and in society.

THE ROLE OF WOMEN ENGINEERS AND SCIENTISTS IN A DEVELOPING NATION LIKE NIGERIA

By Deborah Enilo Ajakaiye

Nigeria with an area of over 1,013,000 square kilometers and a population of over 55 million is the largest populated country in Africa south of the Sahara Desert. It was first administered as a unit by the British in 1914. In 1960, it became an independent country. The provisions of a written constitution under which Nigeria gained her independence provided for a federal system of government, a Governor General, a Federal Parliament and three semi-autonomous Regional Governments. This form of government proved to be unstable due to various reasons such as the relative sizes and population of the three regions, disparity in education and general development in different parts of the country. In spite of all these, soon after independence, there was a tremenduous drive to improve the lot of the people and to create a happy, stable and progressive country. For example, prior to Independence, there was only one University (the University of Ibadan) in the country but within the first two years of independence four other universities had been established. However, like all other African nations, we have had our own share of military coups. After these coups, the country was divided into twelve states for stability. One of the states unfortunately decided to secede and this resulted in our well publicised, devastating civil war which broke out in 1967 and lasted for well over two years. The country's development was retarded during the war but the reconciliation, rehabilitation and reconstruction programmes' have been carried out effectively in a remarkably short time.

Now the campaigns everywhere is for hard work, integrity, rapid development, and the cultivation of a national awareness of the importance of science and technology. The discovery of oil - Nigeria produces over one million barrel of oil a day - has provided the capital for industrialization and development in general. However there have been social interactions which have arisen as a consequence of this development. Prior to the discover of oil, Nigeria had been mainly an agricultural country although minerals like cassiterite and columbite had been mined in some quantity during the past 50 years.

Modern Science and technology is slowly but surely making its impact on Nigeria. The efficacy of science and technology in any developing nation such as Nigeria is the acceptance of change. The scope of this change even within a generation could be enormous and consequently raises a number of problems which are to some extent sociological and political. Women Engineers and Scientists role in effecting this change is quite importance, and even though this may not be regarded as an easy one it is nevertheless not a formidable task. Women temperamentally adapt more readily to change and they can influence a society more unobtrusively than men.

Women throughout the ages have been basically assigned the role of looking after their homes and family. The men support their families, by bringing in the food while the women traditionally prepare the food. In the pretechnological age in Nigeria for example this division of labour as it were/greatly modified. .A great number of women combined farming /was with their essential role in the family and society. A man is known to practise polygamy for example, in order to have more hands to help on his farm. It was also the tradition that the dignifying jobs or jobs that met the public eye or public acknowledgement were left for the men while the women carried out the menial jobs. Cultivating for example was regarded, as a man's job while harvesting was reserved for the women. Ester Boserup's in her latest book summed it up ably as "Tree felling is nearly always done by men but to women fall all the subsequent operations; the removal and burning of the felled tree; sowing and planting in the ashes; the weeding of the crop; the harvesting and carrying in the crop, for storing or immediate consumption." It does not require any complicated mathematical calculations to arrive at the conclusion that women in carrying out this near to impossible task used up far more energy than men. Taking another example, devoid from science, the chief traditionally had several wives and women were generally not allowed to sit as judges in court or as public advisers of the chief who was traditionally regarded as the administrative head of the village. However the counsel of the most senior wife given in the, privacy of the palace, is rarely neglected by a. chief. I have cited here two examples in agriculture and civics to illustrate that woman in my part of the world have always played a dual role effectively in the pre technological age. With the introduction of technology with its innumerous problems women engineers and scientists can face up to the challenge and continue to fulfil this dual role in their family and society. Unfortunately, far more men than women are educated in my country presently that majority of the women are ill equipped and not at all well prepared to fulfil their essential role in the family and in society. The following table is a summary of the intake in a Science faculty in one of the country's new higher institutions of learning.

Year	Total intake	Female intake	% female
1966	46	6	13
1967	64	5	7.8
1968	100	10	10
1969	103	11	10.7
1970	56	9	16

The four other Universities have a much larger intake but the percentage of women rarely exceeds ten percent. The reason for this great disparity in numbers is that too few girls with the relevant qualification apply for admission to these institutions. This is very much related to the fact that our women regard science and engineering as very difficult subjects and this attitude is encouraged by our men. Also some of our women still feel that a profession like engineering is beyond a woman's.

Scope. We need not only the examples of our women engineers but also those of professional women engineers from other countries to serve as an incentive to a number of our girls. Our women Scientists and, engineers would have to take more active part in the developing projects. several projects e.g. bridges, roads etc are always planned in Nigeria, according to men's decisions and designs regardless of the opinion of women who intake up about half the population! In general, the importance of women education is just being realised. The first women schools catered mainly for domestic science subjects and no science subject was taught at women teacher training colleges. Girls secondary schools came later with very little or no science on the curriculae due to lack of facilities and Women Science Graduate teachers. Girls were seldom allowed to acquire further education before they got married sometimes much against their wishes since their parents did not understand the importance of education. It is still true to conclude that in certain parts of my country,; (1) there is a prejudice about women education: (2) girls are more useful to their mothers in the home and so are often kept out of school; (3) there are very few girls secondary schools on even co-educational schools; (4) there are not enough qualified staff to teach in the girls schools. Perhaps the situation can be improved if those at the elm of educational policies in developing nation such as Nigeria should not only embark on campaigns to convince society of the need to educate girls but should also actively encourage co-educational schools to effect optimum use of specialist staff and equipments. The products from such schools would then be adequately prepared for a University education in science or engineering.

It is gratifying to note that the few women scientists and Engineers have been considered as efficient as men in various reports. Unlike in some of the developed nations these women are given equal opportunities in terms of employment as their female counterparts. This in many- respects is inevitable due to the shortage of man power in scientific and technological fields. It is now becoming generally accepted that our female engineers and scientists work as hard if not harder than male engineers or scientists. Girls are now being sponsored for courses like surveying and civil engineering even in institutions overseas. In Nigeria, there is hardly any profession scientific or technological where there is no woman representation.

A few of the problems confronting a developing nation such as Nigeria in this technological ers is analysed below so as to highlight the role of the Nigerian Woman Engineer or Scientist.

Education Education is fundamental to social, economic and scientific development. The Nigerian government is aware of this and in all the expenditures of the twelve States which form the Republic of Nigeria, education tops the lists of priorities. Until 1944, most of the schools were controlled by religious bodies and the government's policy was to give financial assistance rather than to extend its own system but since

Then government Participation in education has increased rapidly. Presently in most parts, of the/country the government has taken over full control of all the schools. In spite of the rapid development of the educational system since independence, there are still gaps. The main problems are the low literacy rate, the lack of certificated teachers, insufficient number of schools and inadequate facilities. An increasing problem is the growing gap between the number of primary schools and available places in secondary schools, which has led to unemployment among school leavers. To help wipe out illiteracy among adults, adult education classes are now held allover the country. Other provisions made by the Federal and state Governments to tackle this problem include, the introduction of free primary education throughout the country, extension of secondary Education, Vocational and Teacher training institutions and University Education. Emphasis is placed on science and Engineering and scholarships are presently basically being awarded on a 3 to 2 ratio in favour of science and technology, that is, only 40% of the awards go to Arts and humanities candidates. There is a need for a greater number of technical institutes. Already the country is turning out far more Engineers and Scientists and very few technicians or technologists. The reverse should be the case for any rapid development such as is clearly demonstrated in the developed nations.

Agriculture In most of the developed nations of the world, modern science and technology has revolutionised agriculture. For any significant development in agriculture, scientific methods must be introduced and long tera research - in various fields for example solid science, water resources, pest movement and control, plant selection and food technology - relevant to the natural environment must be embarked upon. In Nigeria, the problems encountered to the applications of scientific methods to agriculture are resistance to change and the fact that peasants farm small scattered plots of land. Some of the farmers do farm naturally scientifically en hill slopes with contours using small terraces, other do not, while other have to be taught the benefits of rotation of crops etc. Our farmers not only have to be' encouraged to change their methods of farming but also they must be convinced of the benefits resulting from such a changes. Our women engineers and scientists role as agricultural research offices, engineers or extension workers in this regard cannot be over emphasized.

Geology In another field such as geology, the need is for basic geological mapping and description of the rock types of the entire country which could provide the background knowledge or the civil engineers, hydrologists, mining engineers and exploration geophysicists in search for mineral deposits. Sometimes the/question is posed as to whether the mineral deposits revealed by exploration should be exploited or to delay exploitation and await industrialization when the minerals would be needed. The changing world's need and the discoveries of synthetic substitutes would make the delay in the exploitation of mineral deposits precarious. Obviously, the search for mineral deposits should be intensified, the deposit' should be exploted and the money obtained from these could be used in building industries and providing the capital for other urgent developments. Oil has

Been discovered in commercial quantities and Nigeria is now one of the ten largest oil producing countries. The revenue from the oil industries has been used in financing other projects and industries.

Industrialisation Industrialisation often has to follow agricultural development. Results of research into local plants could be applied in the setting up of industries which would produce other products from the local materials to replace imported goods. Similarly native drugs an' medicines which are often extracted from tree trunk' s and leaves could be manufactured on a large scale. Many more industries based on petroleum products still need to be established to produce plastic, chemicals etc. There is a great tendency for people in my country to move from the rural areas to towns and cities in search of jobs in offices, factories etc. In order to counteract this, and to for stall famine, Nigeria has placed a great emphasis on agriculture in the next four year development plans. While as a whole there is a need for stressing the importance of agriculture in semi-arid areas in the northern part of the country, because of the high cost of water, the land may be probably more useful as sites for industrialization rather than for agriculture.

In addition to the purely scientific role which the problems highlighted in the preceding paragraphs demand of our women engineer and scientists, there are other sociological problems confronting Nigerian women. Firstly, some of our male counterparts still recent our new status and would like our women to remain confined to the kitchen and the home - even though some of them know that the development of a country is strongly influenced by the status of women in the community. They find it difficult to accept the fact that one could be an efficient engineer and a good mother at the same time. Secondly and perhaps the most trying experience is the lot of the unmarried woman Engineer or Scientists. The Nigerian Society is not quite adjusted to this situation and people find it difficult to understand why she is single. Some have the erroneous idea that this is related to her choice of career that is, because she is an engineer (a profession which is usually associated with men) she must necessarily remain single to prove her equality with men.

In conclusion, it would appear that our society demands more from our women Engineers and Scientists than what is expected from such women in more developed nations. However Nigerian Women Engineers and Scientists are convinced that our society can have the full benefit of science and technology without losing all its traditional and cultural heritage. A society devoid of its traditions as a result of scientific Development is left with a gap. Such a situation has often been exploited by politicians who will attempt to fill the gap with various idealogies. Our educated women are working as hard as they can in various fields to make sure that this is not the case in Nigeria. Apart from contributing their quota to helping in the scientific fields they organize conferences on topics such as education and civilization where such problems are discussed by both eminent men and women and every effort is made to pass on the masses the results of these deliberations.

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PROBLEMS DUE TO EVER INCREASING MASS PARTCIPATION OF WOMEN IN SCIENCE, TECHNIC AND PRODUCTION PROCESS IN THE SOCIALIST COUNTRIES AND ITS INFLUENCE ON THE WOMEN I S POSITION IN THE WORLD

By Véra preiningerová

Curriculum vitae

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Summary

The subject of the article is the standing of a working woman in manufacturing, science and technology - its hystory and the different features of the situation of women in different countries. Further problems related to the increasing mass participation of women in production, science and technology in the socialist countries are discussed, problems that arise for the whole community and for the women themselves, the possibilities and difficulties' of their solution, proposals for necessary changes of a social and economic nature and, finally, the advantages resulting for women from the new situation.

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By Věra preiningerová

The world of employment, i.e. the world of manufacturing, technology and science, is more or less a world of men, while the home, children, their upbringing, the care of the family and household represent the world of women.

It is a kind of specialization that has been developing for hundreds or even thousands of years. While the whole family was working together in the fields, a close link existed between the men's and the women's world. The same was true, when the man was carrying out his trade at home. But with the advent of capitalism, with the growth of production and its increasing mechanization, the production process was centralized in the factories, often in a different locality than the one in which the family was living. Except for a temporary period of the early capitalism, when even children were working in the factories, the main and leading manpower of the factories and the whole national economy are men. The amount of time the man spends outside his family is increasing, the differences between the men's and the women's world are growing: the interests, experiences, pattern of work and life and, eventually, the hierarchy of values are all different. Naturally, men organize their own world in their own way, no matter whether it is the design of machines /their adjustment to the anthropometric and biochemical dimensions/, the organization of the production process, or criteria of success, or the ultimate goals to be attained.

In parallel with this process another, antagonistic, aspect of social development can be observed: due to advances achieved in science, human life has been prolonged, child and infantile mortality has been reduced, many handicapped persons, whose survival would have been previously impossible, have been kept alive. In the countries of the third world the population explosion is a serious problem, the number of children is growing very rapidly. As a rest the percentage of persons in the productive age "is falling in relation to the whole of mankind. But society is responsible also for its non-productive members. It is a liability that cannot be borne by society, despite the great growth of productivity, without an increased labour force, especially when in many countries - the growing demands made on the entire pattern of life, housing, food, clothing, etc., must be taken into account. The source of new labour is chiefly women. And thus we see the paradox that the social development which, first of all, more or less excluded woman from the production process, from its organization and management, or which, at least, made her play a subordinate role, now brings a steadily increasing number of women into the world of production, to the working world, to the world of men, in the building and organization of which women did not take part previously and which is foreign to them. All this requires a great deal of effort on their part to

Adjust themselves /just how much effort is needed, depends on the nature, age and qualification of the particular women/ and, for the most part, they feel less satisfied in this world than men.

In some countries the need of new manpower is not so urgent, the productivity growth is faster, or other labour resources are available, e.g. immigrants. Yet, even there women enter employment, voluntarily, from a desire for self-realization, self-assertion, or in an attempt to improve the financial standard of the family. This is obviously a consequence of the world, movement for women's emancipation. Even these women, however, enter a world of employment foreign to them, they have to secure their position and recognition at work under great difficulties, and certainly with many more difficulties than men. The obstacles they have to face are due to prejudice, tradition, the tax system, the system of rewards, etc., and their effect is probably the stronger the less society needs, from the economic point of view, the immediate employment of women.

The adjustment is naturally expected to be made by women, and not vice versa, that is to say by society, by the institutions, in other words fundamentally by men. And why should it? 80 far, in the world of employment women are in the minority, mostly in subordinate posts. The power to make changes is in the hands of men and they are not interested in making changes and often do not even know what should actually be changed: first of all, they do not personally experience the problems a working woman must tackle all day and every day. And then - it is well known, after all, that one is less receptive to new information, the more it interferes with his fixed pattern of behaviour, views and attitudes. The conviction of the priority of men and inferiority of women in the world of employment surely belongs to the well-rooted, even though sometimes subconscious, security of almost every man. There is no reason to expect then, that the new information about the imperfection of the present system of organization of work, production, public life, education, health services, etc., as seen from the point of view of women, or the women's ,demands for changes, will be accepted by men with enthusiasm and will be implemented by them without delay.

And yet, changes are and will be necessary. It will be the task of those who are most interested to achieve the most important changes, and to achieve them in the, optimal way and with a minimum number of mistakes. It will need time and effort and an analysis of the problems of women and of their situation, which is different in each country and in each social system. It depends on the traditions, on the wealth of the country, on the technical and cultural level, on the population policy, on the standard of services, and many other factors. Despite the enormous diversity of all these aspects, I believe that there exist certain problems common to all women, and other that are common at least to women of a certain political and economic sphere. This is confirmed by my own and my colleagues' experiences, gathered at meetings with

Women from abroad. Among the community-wide women's problems will surely be the solution of the conflicting maternal and working duties, although the actual methods of solving them will greatly depend on local conditions. The problems depending on the existence of a particular political-economic sphere include .for instance the participation of women in the management of society and production and system of rewards, and certain social-health questions, such as pregnancy and matenrity benefits, birth control, etc.

For the situation of women in the socialist countries the mass incidence of their employment is characteristic, the highest employment out of all these countries being in Czechoslovakia. Allow me to give a few figures showing the participation of women in studies, in production and in public life.

At the present time there exists in Czechoslovakia an absolute numerical preponderance of women: 105 women per 100 men. Women keep this preponderance also at schools for general education /62%/ and vocational schools /55%/. At the universities women students correspond to 39%. It is interesting to note their distribution in the different branches of university studies: arts three fifths/, teaching - as much as three quarters/, science - only one fifth, of that electrical engineering only one tenth, mechanical engineering as little as one fifteenth.

How high the employment of women in this country is, is shown also by the fact that cut of the total of employees - 7 million persons - there are 3.2 million women, which means that there are really very few housewives in our country. /The participation of women in the management of society is, however, naturally much smaller than would be expected from their number: among local government deputies only 20% are women, in the higher functions of factory management, in general directorates, the ministries - women only sporadically hold posts of responsibility/.

This mass participation of women in the production process involves and emphasizes, in our country, problems that are not probably encountered by women in other countries or which, at least, are perhaps not so striking there. On the other hand, this mass participation makes it necessary to deal with these problems now, while in other countries their solution is being postponed. In my opinion, our country can be considered, from this point of view, as a sort of model climate for an accelerated maturing of problems resulting. From the mass employment of women.

What is the situation and what are the problems then of the woman in our country /with regard to the interests and professions of the ladies here present/ and what is the situation and what are the problems particularly of those women who are engaged in technology and science,

Technology, chiefly electrical and mechanical engineering, remains a. distinctly masculine domain. This is clear also from the figures on women's studies. However, even these branches attract an increasing number of women, and men have become accustomed to their presence, so that they no more regard

Them as something peculiar and extraordinary, but consider them as normal colleagues needing no special concern or privileges. .

I believe that, during their studies and soon after their completion, women generally do not meet with specifically feminine obstacles and, on the average, they are at least as good at their work as men. By this I do not mean that, on the average, we are cleverer than men but, on the one hand, at this age girls are perhaps somewhat more conscientious than boys and, on the other hand, once a girl decides on such an unusual profession it is certain that she has a gift for mathematics and physics. Boys do not give so much thought to this choice as a rule; similarly as girls who wish to take up for instance the teaching professions.

Women graduates of these branches work more in schools, research institutes, designing and projection offices and computing departments. I do not know of a single woman who is engaged in operation or in a test-shop, who is a manager of a power station or something like that. I would not say that this is due to the women's lack of practical organizational abilities, but it is more a question of tradition and the authority over subordinate men employees.

As far as professional growth and a career are concerned, the critical period for a woman comes when she marries and has young children. It is a great disadvantage for a woman when she is in her thirties, i. e. between the age of 30 - 40 years, the age which is for a man the period of his maximum professional growth, maximum creative abilities and expansion, when he forms the decisive background for his knowledge and experiences, she is occupied with her maternal duties, the biological task of preserving the species. At this period many women stagnate or even go down in their profession. It is no wonder: in this country most women remain at home six months to one year after the birth of her child. Only exceptionally a woman stays at home longer, mostly when she has other children. When the woman re-enters employment, the child is looked after by his grandmother or a baby-sitter /who is difficult to find and is expensive/ or is sent to a créche. In the créches the children are often ill arid for many of them créches and nursery schools are totally unsuitable up to the age of 3 or even 6 years. And here the everyday whirl starts for a woman the lasting desire to fulfil so many almost unrealizable tasks, to meet so many conflict demands: to give everybody his due, her child, her husband, her employer. There exists no objective criteria estimating to what extent the meeting of all these tasks is successful; the consequences of certain errors and mistakes, e.g. in child-rearing or continuous overwork, may appear only after many years. Certain adverse phenomena that may be attributed to high employment of women /but probably not to this fact alone/ can be observed already: in Czechoslovakia the birth-rate is steadily declining, the number of artificial abortions and the number of divorces are rising, systematic overwork of women leads to rising morbidity, chiefly gynecological diseases /miscarriages, etc./ are becoming more widespread. .

Naturally, this problem concerns all employed women, not only those engaged in technology and science. In other countries, where the situation is different, it seems to be possible to tackle all these things in another way, more simply. Especially these two ways appear to be feasible:

1/ Women who decide that they will devote their life to science or any other demanding profession should not have children.

2/ Women should stay at home with young children /e.g. up to the age of 10 years/.

But both the mentioned possibilities also have their shortcomings, mainly for the women themselves. The first one means an immense impoverishment for a woman - does she then continue to be a woman in the true sense of the word? Maybe men or women who have never had children will say: "Why not?". But what will be the answer of the women who have children?

The other possibility is more natural, but even so the woman will encounter problems. When the financial situation is not taken into consideration, and this carries different weight in different countries, the woman will have to adjust herself psychologically to the great change of her pattern of life from a social and professional point of view land this is no negligible problem for a woman who liked her work and was successful in it/. And, further, it is questionable whether she will succeed in keeping her professional skill during the years when she is at home, or whether she will be able to catch up with it again later on.

Nevertheless, for instance in Czechoslovakia the two ways mentioned here cannot be put into practice on a mass scale. It is made impossible by the very mass employment of women. A truly mass implementation of the first possibility would in fact mean extinction; realization of the second possibility would bring about a great shortage of personnel and wastage of the resources spent on the training of qualified staff. Besides, when a woman decides to remain at home for a prolonged period of time, it generally involves considerable financial sacrifice and an appreciable drop in the family's standard of living, which - in turn - often leads to a tense atmosphere in the home, conflicts that may end in the breakup of the family. The children for the sake of whom this solution was in fact adopted in the first place, are the ones who eventually suffer most.

A certain number of our women forego motherhood or at least limit their family to one child only. This is evident from the falling birth-rate. Thus the birth-rate is being limited in the class with the highest qualifications, education and standard of living where, at the same time, there is the greatest hope of securing for the children the best care and conditions for their sound development so that they may become persons with cultured qualities. Society is reproduced chiefly from the more primitive class, often from deficient individuals, and thus the general quality of the population is necessarily getting worse.

I consider, therefore, that the optimum approach is the one which lays high demands on a woman land on the other members of the family as well/ but, in case of success, it also affords the greatest advantages: after - let us say - a year after the birth of the child the woman returns to her employment and the tries to comply with her duties both in her home and in her employment. Another solution should be chosen only in exceptional cases, e.g. when the child is unsuitable for a children's institution and when a grandmother or a baby-sitter are not available.

You will think that I am biased but, in my opinion, it is remarkable in what a high percentage of the families women do, in the end, succeed in mastering all their duties. How much inventiveness, self-sacrifice and organisational abilities they have been able to find! The organisation of work in certain households could serve as an example for the management of much more complicated systems. It needs, however, understanding and help on the part of the other members of the family as well. And as among those concerned are also men, this may be perhaps the motive power for bringing about the desired changes. And there are so many changes by which the community could help women meet their duties fin fact for its own benefit/. Let us mention, at random, a .few of them: longer maternity leave, benefits payable to mothers of several children or children who do not thrive when placed in a children's institution, enabling them to stay at home longer. A sufficient number of inexpensive and good quality services, good supplies to, and good organization of shops, good meals for children in schools, a sufficient number of creches and nursery schools, possibilities for shorter working hours /e.g. only 4 - 6 daily or only certain days in the week/ without the risk of losing a good post, etc.,

I do not mean to say that nothing of this kind exists as yet, or nothing is being done in this respect to improve matters. I am also aware of the difficulties which will have to be overcome in the realization of some of these problems. Yet, in order to safeguard its own reproduction, society and all its members should regard all this as a 16gical duty. All the adverse phenomena mentioned, such as the falling birth-rate, etc. - chiefly affect unfavourably society itself. The number of productive persons of high intelligence will be smaller in the future and this will result in a decline in the standard of living of the whole community.

The solution of the conflict between maternal and working duties is not the only problem to be resolved. There remains unresolved the question of women's real equality. In appointments to the higher posts men are still being given priority over women with the same qualifications. There does not even exist equal pay for equal work. It is a well known fact that in establishment employing chiefly women /e.g. the textile industries and telecommunications/ the productivity and standards are much higher than in establishments employing mainly men, yet the wages do not correspond to this. This is due, on the one hand, to the more submissive nature of women and, on the other hand, to a

Lack of trade union practice, in contrast to men. I believe that even these questions will be solved in the course of time and that women themselves will bring the greatest contribution to the solution.

For a woman, her employment does not represent only negative factors. On the contrary: if she succeeds in meeting all her duties, it gives her a feeling of satisfaction, independence and security. The more all-round demands made on her, lead to a more all-round development of her abilities. Her fuller personality is an advantage for the whole family and improves its pattern of culture.

Moreover, science as a career gives women an enormous benefit: an interesting work which can be done as a hobby, a further raison d 'etre, something to cling in the various emergencies of life, e.g. when her marriage is broken or when a dear person dies, etc. And, in contrast to a man a woman has the advantage that if she experiences a failure in her work or another shock /for instance retirement/, she has so much to live for in her children that she can better cope with such a situation.

The all-round development of a woman's personality, success in her work and her growing prestige cannot remain without effect on the general status of women and their appreciation. The mass incidence of this phenomenon in the socialist countries, the fact that, after all, it is a success of the average, does not allow us to disregard it and to proclaim that it is only the exception that proves the rule. The awareness of equal abilities of women is gradually prevailing in the whole community. This may mean a great support in strengthening the woman's status in other countries, too. Experience in the solution of problems associated with the mass entry of women into employment may prove to be equally valuable.

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TITLE OF PAPER: "The Evolution of Women's Role in the United States"

AUTHOR'S NAME: Evelyn Harrison

BIOGRAPHY:

Miss Evelyn Harrison is Deputy Director, Bureau of Policies and Standards, U.S. Civil Service Commission, concerned with legislation and policies governing 2,500,000 federal employees and job standards and tests covering their occupations at all levels. She is a graduate in civil Engineering from the University of Maryland; she began her career as a draftsman with the Geological Survey and transferred to the U.S. Civil Service Commission as an examiner in engineering and allied fields.

She has served on numerous Boards, Commissions, and Committees, including the President's Commission on the Status of Women, the District of Columbia Commission on the status of Women, and the Women's Advisory Council on Poverty. She was Director of the Federal Women's Program to provide equal opportunity for women in the Federal, Government in hiring, promotion, and training, 1964-1969.

She is the author of a number of articles about the employment of women in the United States. She is a recipient of the Federal Woman's Award to outstanding career women in Government.

SUMMARY OF PAPER:

During the past 100 years the transition of American society from a predominantly agricultural one to a highly industrialized urban one has effected major changes in the role of women in the United States. From an almost entirely family-serviced oriented role with legal status somewhere between a chattel and a minor, the American woman has emerged today in the role of a participating member in all aspects of American life. Full participation has not yet been acquired; many discriminations and inequities still exist. However, her movement into the labor force in the millions over the years, her deep involvement with volunteer activities of broad citizen and cultural concern, and concerted efforts for civil and political rights have freed her from' many past legal, economic, and social restrictions. Today there is a new wave of feminism sweeping the country, motivated in part by the climate of dissent and disaffection of youth and minority ethnic groups with the country's institutional and societal structure.

THE EVOLUTION OF WOMEN'S ROLE IN THE UNITED STATES

EVELYN HARRISON

The feminist movement today in the United States has a variety of facades. Its voices are many; its ideologies differ. While the mass media has to some extent over-publicized its more vocal activists, it has also underrated its wide range of support by both men and women throughout the country. Despite seemingly sharp ideological differences, the common thrust of all segments of the movement is toward major societal changes in the role of American women. The objectives vary from the elimination of all educational and employment practices discriminatory in any way to women, to the attainment of equality of legal rights between both sexes under national law, to essentially a restructuring of the society and the role of men and women.

Women got the right to vote in the United States in 1920. This was the climax to a struggle that began almost 100 years before. In 1848, at a meeting in Seneca Falls in New York State, a group of indignant and rebellious women met to discuss the social, political, and civil conditions and rights of women that barred their participation in the major institutions of American society. They set forth their complaints in a historic document that they declared their "Declaration of Sentiments." This document graphically and dramatically characterized the status of women in our country at that time. Women were, legally, somewhere between a minor and chattel. They had no right to vote; they were denied the opportunity for college education or professional employment; and, if married, had, under the laws no property rights nor in many cases, entitlement to their own earnings if they became gainfully employed.

Enormous societal changes have occurred since that time, changes which, for the most part, have been concomitant with the great industrial and technological revolutions through which this country has passed and in which we are currently involved. The forces and factors which have changed our social, cultural, and economic structures as a nation, and which have changed US from an agricultural to an industrialized, urban society have had a dramatic impact on the role of the American woman in that society.

Existence in the United States of the Puritan concept of work which encouraged everyone to work, including women, was prevalent during the period when the primary economic unit of the nation was the family farm. Women were involved full time in working partnership in the family unit in the care of the sick, in the education of the children, in the weaving of cloth and the making of garments, in the preparation and preservation of food. Men were occupied in the more physically demanding work involved in agricultural production. As we moved into an industrialized society at the turn of this century the American woman's first major entrance into the work force was largely into those fields in which she was associated in the home environment the production of goods, services of various kinds, nursing and teaching.

In looking at the evolution of the role of the American woman we must realize that improvement in the "standard of living" has been a motivating factor in the development of the American .culture over the years. Successive waves of persons from many countries came to America in the 19th and early 20th century looking for greater opportunity and freedom. With a diversity of background and lack of common tradition, the attainment of material goods became a unifying force in a society where class distinctions were fluid, where privilege was not based on birth, and where equality of opportunity was often evident through success in the market place. We became a nation conspicuous for our production of consumer goods and for their consumption.

An influential middle economic class soon evolved whose ,power and prestige were measured in large part by their affluence. At the same time industrialization and urbanization were releasing the American woman from some of the former consuming demands of the home, the educational system was beginning to provide her free primary and secondary education and opportunity for higher scholastic training, and medical science was prolonging her life' span.

Jobs in factories and other industrial enterprises opened up and more women began to move into the labor force, in most cases to increase the family income in order to upgrade the family standard of living, or, if single, to provide self support away from family dependence. Other women whose financial conditions were more substantial began to participate in voluntary activities to improve the quality of community life, in many instances aimed. at improving the living and working conditions of wage-earning women and their families.

This dichotomy of women's activity outside of the home produced an unfortunate psychological image in the public mind of the working woman. In a highly competitive male dominated society the working wife quickly came to typify the inability of the husband to provide adequately for his family, while the non-working wife assumed an ornamental role in the public eye as a living testimony of her husband's success. "Woman's place is in the Home" gained an added emphasis as a social more, though volunteerism was socially acceptable and encouraged.

Thus, an important role of the American woman for many decades has been her participation as a "volunteer." Over the years the nature and motivation of volunteer activity has drastically changed. The "lady bountiful" approach has given way to a sophisticated, professional involvement. Today, through public and volunteer organizations, millions of American women, including a large percentage of employed women, give a wide variety of services to youth, the aged, the ill, the handicapped, and the disadvantaged.

Demands upon women in the economic world, the community, and the home means that women often simultaneously carry on several different kinds of activity. Women have promoted legislation to provide more and better education, to benefit the consumer, to improve labor standards, to assure civil right, and to eliminate the waste of natural resources and the pollution of water and air. They volunteer their services and make significant

Contributions in the areas of health and hospital services, welfare, education, and cultural programs. Many serve on, boards and councils at the national and local levels functioning in a diversity of areas of citizen concern. This "volunteer" activity of the American woman is an important aspect of American life.

During the first two decades of this century more and more women leaders gained public recognition and enlisted thousands of other women to carry on the battle for women's legal rights and legal protections against flagrant economic exploitation of working women and the appalling conditions under which they were employed. This began to force public attention on the economic and legal deprivations of women and culminated in the elective franchise being granted in several States prior to the amendment of the Federal Constitution in 1920.

Laws setting minimum wages, limitations on hours of work and weight lifting, and laws requiring inspection and regulation of factory operation and installation of safeguards to reduce industrial hazards were enacted in many States during this period. In 1920, Federal legislation was passed to establish the Women's Bureau in the Federal Department of Labor which was charged with formulating standards and policies to promote the welfare of wage-earning women, improve their working conditions, increase their efficiency, and advance their opportunities for profitable employment.

The social and economic turmoil subsequently created by two World Wars advanced new occupational opportunities for women and shattered many previously established conventions. Women moved into the work force by the hundreds of thousands and stayed.

Recognition of their competency and ability to perform at various levels in many occupations became publicly evident but certain myths about the working woman persisted -- and many still prevail today, though the social stigma formerly attached to the "working-woman" has disappeared.

"Since women are working only to supplement the family income they are temporary workers and are not interested in careers" -- "women's aspirations and expectations are limited" -- "women are better fitted than men for routine and monotonous jobs. -- "women are too emotional and not temperamentally suited for supervisory or responsible professional positions" -- "women are sick too much" -- "women do not like to work for other women." We are all familiar with these and other allegations about the employment characteristics of women -- allegations proven as myths time and time again. They have been, and are, used to deny women employment or advancement in many occupational fields and for the most part has relegated them to the lowest paying and least responsible occupational rungs.

Another form of discrimination springs from the outmoded but still lingering belief that certain occupations should be properly filled by women only and others by men only. The validity of this stereotyping of occupations as "masculine" or "feminine" is still accepted by a large segment of the general population. Until these attitudes change, and the parental and vocational counseling of girls and boys are directed toward individual

Ability rather than sex, there, will continue to be an adverse impact not only on the employment of women but, more basically, on their educational preparation.

Women have begun to move in increasing numbers, nevertheless, into professional, administrative, and technological fields previously almost, exclusively a masculine domain. They comprise 38 percent of the total work force and hold 40 percent of all technical and professional positions. This does not mean, however, that today's American women are either fully accepted in all occupations or given equal opportunity for advancement commensurate with their ability or potential. There are few at the upper levels in management, and the professions, those of control, direction and decision making particularly.

Women constitute a majority of teachers in primary and secondary schools, but only 22 percent of the faculty and other professional staff in institutions of higher education. Women are heavily represented in the health field as aides, nurses, and technicians, but only 7 percent of physicians are women. Similarly, women have only a token representation among scientists (9 percent), lawyers (3 percent), and engineers (1 percent). An encouraging statistic is in mathematics where over 35 percent of the current college graduates are women and in law where the percentage of women students is now 8.5 percent and increasing.

A greater public awareness of economic inequities and barriers to full participation of women in American life built up as a result of their continued expansion into the labor force during the 1940's and 1950's. In 1961, the President established a Commission on the Status of Women to review all aspects of the American woman's role in our society and to make recommendations for improvement. The work of that Commission and the subsequent work of similar Commissions established in each State, stimulated action at the national and local levels and is responsible, in large measure, for the expectations and moods currently existing today for changes in the character of women's role in our society.

A vast body of Federal legislation has been enacted in the last several years for increasing educational opportunities, (particularly for adult women), for eliminating sex discrimination in employment, for providing equal pay for men and women performing the same work, and in providing supporting child services and work training for women in welfare. At the State level hundreds of labor laws enacted years ago to protect women against economic exploitation and provide better working conditions have been revoked or updated to meet the needs of today's worker, whether man or woman. Other State laws have been changed to afford women civil and property rights previously denied.

In addition, there has been a resurgence of the women's rights movement. This has obtained active consideration in the United States legislature of the Equal Rights Amendment to the Federal Constitution to give all persons equal rights under the law regardless of sex. This proposed Amendment, after 47 years of inaction in the Congress, passed the House of Representatives last year by an almost unanimous vote but failed to be voted on by the Senate prior to adjournment of the Congress. There is

widespread support for the Amendment, but also substantial opposition by some women's and labor groups who believe it will invalidate existing legal protections against exploitation now afforded certain classes of women.

There are numerous organizations engaged in a variety of activities to improve the status of American women. Some are directing efforts to oversee compliance with new legislation to assure that the intent of the law is implemented fully. Others are concerned with family planning, national child development and day care legislation, adequate representation of women in all segments of the society, and greater expression of the potential power of women in the political process. Others are directing their attention to the problem of hunger and malnutrition among the poor, especially the 3 million poor families headed by women.

The new feminist movement in the United States is the Women's Liberation Movement. This Movement began about two years ago around a number of university centers. Women traditionally have had lower social status than men in our society and both sexes have tended to value masculine characteristics, values and activities more highly than those of women. The basic ideology of Women's Lib is that the root problem facing society today is the general oppression of all women -- their psychological subjugation to male chauvinism evidenced in economic, social, legal, and cultural discrimination. In order for woman to realize her full human potential, it is necessary that these barriers be eliminated, first from her own consciousness, and then from her environment. The doctrine which demands that woman organize her life completely around the lives of others, neglecting her own needs and desires, is totally rejected. She must acquire full self awareness of the true nature of the traditional, subjugated role fostered upon her, reconstitute her identity, and then begin to reassess her environment in terms of her own humaness.

In summary, the changing patterns of American women's lives today, together with the current dissent and disenchantment with social systems and institutions expressed by a substantial segment of our youth and by the American Negro and other ethnic minorities, is producing a climate, hopefully, for eventual disappearance of the traditional passive, dependent, auxiliary role of women, a role no longer realistic in a viable society.

Some viewers on the American scene believe we may be entering into a new phase of family relationship -- the keystone of our societal structure -where the roles of men and women are converging and the old male dominated, female serviced, family life is being replaced by one of companionship among all members of the family. Medical science, through the advent of the "pill", has released the American woman from sexual dominance and gainful employment despite its inequities is affecting the power structure of the family unit as the woman contributes significantly to its financial base.

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CONTEMPORARY EDUCATION OF WOMEN IN THE UNITED STATES

Lillian G. Murad – Bablanian

Biography.

During the past thirteen years, the author has been a science educator in Central School District #6, Oyster Bay, New York. Prior to this, she worked in the field of textile printing and textile chemical auxiliaries. Her water -has e pigment binders, developed in 1949, are presently being used throughout the textile printing industry.

A holder of a BChE from Pratt Institute and a masters degree in education, she is also a graduate of the Conservatory of Music of Nice. Recipient of Pratt Institutes Chemical Engineering Alumni Award, member of Tau Beta Pi, second President of S. W. E., she was recently honored as an "Outstanding Teacher" by C. W. Post College, Long Island University.

Author of published works on ancient mathematicians and physicians, the theatre, and the dance, she is presently writing on education in ancient Sumer.

Summary

Although women constitute fifty-one percent of the population of the United States, there has been a decrease of degrees granted to women during the last two decades.

To explain this downward trend, psychological, and cultural controls and attitudes, books, high-school curriculums, college admission and area of study, continued higher education, and opportunity for professional advancement for women are examined.

It is found that women, controlled by traditionally oriented expectations and curriculum, are not free to choose their potential by exploring a wide range of possibilities. Because of cultural and economic restrictions, lack of continued intellectual enrichment and stimulation, she loses the opportunity of developing personal and professional identity that would commit her strongly to her studies and her work.

It is suggested that to reach equality in education, society must be intellectually ready to accept ideological and cultural changes.

CONTEMPORARY EDUCATION OF WOMEN IN THE UNITED STATES

Lillian G. Murad – Bablanian

Considering the fact that women comprise fifty-one percent of the population of the United States, one would expect them to be at least equally represented in all professional fields. However, women's recent access to education and economic and political participation has not, in any way, increased the number of women in prominent positions in business, industry, politics, education, or science. As a matter of fact, there has been an alarming decrease, proportionately, of women in many fields, and particularly graduates from colleges and universities. What is even more significant, is that the percent of MA's and PhD's earned by women in the 1920's, 1930's, and 1940's, is significantly higher than those acquired during the past two decades. (1)

Since education and economy are closely related in the industrially developed nations, since women comprise more than one-half of the population of the United States, this decreasing trend for higher education of women is open to discussion and comment.

There is no denying that we live in a predominantly masculine world. Almost from birth we are indoctrinated with the idea of male superiority and female inferiority. We seem to proceed on the conviction that we really do not expect women to contribute significantly to society in any field. So strong are our convictions that they have become deeply rooted in the present collective consciousness and have been integrated with social norms to operate almost by blind axiom. For several thousand years this has become a cultural tradition: there are male rights and female duties, the male creates and the .female serves ...and all this with the consent of the dominated. What becomes clear is that human behavior is controlled by cultural traditions.

The most characteristic thing about human behavior is that it is not random and is controlled by systematic processes. The sources of control over behavior are other human beings and the society they comprise. Society controls human behavior by shaping their conception of the world they live in, and by directly altering the experiences of the person by utilizing punishments and rewards. One is, of course, cognitive control and the other is control by coercion and seduction. The first operates by the intrinsic self-administered rewards and punishments,

The second is regulated by gains and losses that are extrinsically administered. "It is no exaggeration to say," writes Bruner, "that the role given to each of those forms of control is a hallmark of any political theory of state, and, by the same token, it is the single most telling feature "of any psychological theory of the nature of man (or woman) - whether one envisions this person as ultimately captive of the shaping of his environment or as competent of shaping a world of his (or her) own." (2)

Control of identification and manipulation of the threat of ostracism are two great instruments by which human behavior is manipulated by those who exert power - first in the family and later in the large groups into which the person moves. It is central not only in the control of a democratic society but also in the totalitarian state.

Society manipulates patterns of child training for achieving "official" and cultural forms of control over adult behavior. What is clear in our society is that children learn to become "men" and "women" with conditioning that start’s in infancy and is reinforced by every social experience. From earliest years children form images of their worth, their future roles, the conscious and unconscious expectations placed upon them. It is like a conspiracy: the men know what they are about and the women have been conditioned to follow suit. From the simplest picture books for children to the most sophisticated texts in history, politics, science, and art, it is the male who has direction and seeks an active and creative role while the female fades and becomes shadowy in a passive, complying, almost servitudinal role.

According to Elizabeth Fisher, there is an "almost incredible conspiracy of conditioning." Investigating books for young children in book stores and libraries, she found that boys' achievement drives are encouraged while girls' are cut off: boys are brought up to express themselves, girls to please. '~The general image of the female," she writes, "ranges from dull, to degrading, to invisible." Her study shows that there are five times as many males in the titles of books as there are females. Stories center around boys: they are the doers while the girls are passive - they smile, approve, and help. Although women have entered every conceivable profession, and among women physicians, pediatrics is a favorite specialization, there is not one single woman doctor among all children's books. ,Boys are shown in all active occupations: climbing, sliding, running, jumping, tumbling, bicycling, constructing, devising schemes, inventing, while girls will be found watching, sitting, smiling,

Being pleasant. While men in these books occupy all the leading professional roles, women are shown as secretaries, nurses, teachers, and librarians, and mothers in the kitchen. Although forty-eight percent of all women in the United States are now employed, there is just one picture book, Eve Merriam's "Mommies at Work" that deals with this subject. (3) Where are all those non-married and married women, the working mothers and grandmothers? Is there no room for these productive members of our society in children's books? What kind of world does a little girl look forward to as she scans through .these books?

As soon as the reading process begins, the exclusion of women becomes even more obvious. History, which is a record of our past cultures and seems to be written exclusively by men for men, is silent about any and every contribution made by women in the historic past. Although recorded history dates back many millenia, although it is no longer denied that it is "woman" and not "man" who founded agriculture, was first to domesticate animals, was the first architect, invented pottery, sewing, weaving, and was the founder of medicine, and is attributed to be the prime-mover in establishing communal groups that later developed into towns, cities, and eventually nations, no mention of this is made in any school texts. (4) Although the greatest invention of all times, the wheel, and systematized writing emerged during matriarchal times, although the Pythagorean school was run by Theano, reputed to be the wife of Pythagoras, although Socrates was taught by a great woman philosopher, Diotima, the priestess of Mantinea, the founder of the first national hospital system and nursery was Queen Khosrovanoush, although the founder of modern botany was the Saintly Hildegard, the founder of analytical geometry, Maria Agnesi, the co-founder of modern chemistry, Marie Lavoisier, the founder of radioactive chemistry, Marie Curie, the discoverer of Rhenium and first to conceive the idea of nuclear fission, Ida Noddack, the prime worker and prime participant in controlled fission, Lisa Meitner, the investigator who held the "key" to the "double helic" of the DNA, Rose Franklin, just to mention a few, none appear in our historic literature both social or scientific.

. In view of this historic oblivion, of utter historic non existence, girls find no identity, no reality in our present-day culture or way of life. Gifted girls face special problems of identity and self-esteem when they consider any professional activity and work. They are the "other," the" second," the "fair" sex - completely alienated and eliminated from contemporary demands. Screened out and shut out as a force in historic

Developments of humankind, they are conditioned to the role that society spells out for them - domesticity.

In grade school, little girls' ambitions range from wanting to be a mother, a teacher, or a nurse. No one, not even their parents, will tell them that their aspirations have no boundries. It is usually the daughters of professional women, and very few at that, that set their aims for law, medicine, or engineering. The boys, 'on the other hand, are encouraged and even urged by both parents and teachers to think beyond their first dreams of becoming a policeman or fireman. By the time the boys are in the upper grades, at least fourteen percent of them know the direction in which they will be moving. Only four percent of girls make their decisions that early. (5)

As we move from childhood to young adulthood, there are other conforming rules that specifically apply to girl high school students. Compulsory education subjects all students to our contemporary culture based on meritocrity: we train our students to compete, to be status conscious. The controlling disciplinary factor is based on conformity and unquestioning obedience to authority. American public schools train people to fit into its society as it exists. The result is obvious: courses of study reflect the traditional roles men and women are expected to play. One year of home-economics is still required of all female students and continued courses in this subject are often urged by guidance counselors. In these courses girls are taught to sew, to cook to "run" a house. Boys have electives like the “Chef’s Course, “or "Tailoring," or "Household Management." The irony is that girls learn to sew, cook, and "run" a house, while boys become chefs, tailors, and managers. On the other hand we find a wide range of subjects the boys can take and from which girls are generally excluded: woodworking, electrical shop, machine shop, and mechanical drawing. School policy generally denies her admission to these courses. These are skills that only men learn. In any high school we find a large majority of women in business typing, shorthand, and bookkeeping classes. 'The boys select "personal" typing and business arithmetic. In the academic areas men are encouraged to take more challenging subjects, especially mathematics and science. If a girl does poorly in these subjects, it is "understandable" - she is just. not expected to be as competent. However, those who take equivalent academic courses with boys, excel by far in achievement and grades. According to the Princeton Report, more girls than boys receive grades of "A" at the high school level. (6) Thus, although girls have as much intelligence and ability as boys

(Though few educators act as if they believe it), high schools do not equip girls to choose their own potential by exploring a wide range of possibilities. In addition, parents, guidance counselors, and teachers often limit women's academic aspirations, recommending less ambitious courses, careers, and colleges.

On the university level, women do not have the same access to education as men. Although, for economic reasons, male colleges now admit women, there is an obvious quota system against women applicants. Co-educational institutions have been suspect of exercising a quota, but their methods have been more discreet. The national ratio of college students *is* two males to one female.

Institutions of higher learning tend to segregate men and women into traditionally acceptable curriculums: assigning the humanities, teaching (mostly on the elementary school level), and the lower or marginal branches of certain social sciences to women, and the sciences, engineering, law, business -- the higher professions -- to men. (7).The protege system that works so well for men very seldom applies to women. While male students are advised, encouraged, and guided toward continued higher education, women are abandoned to proceed on their own, propelled entirely by their own personal will and personal ambition. As a result, most of them make their decisions for higher degrees toward the end of their fourth year in college. (5) In addition, because there are so few women occupying, professorial chairs, the female student has no one to turn to in her professional field and particularly, no one to identify with. Thus, she loses the opportunity for intellectual enrichment and stimulation for developing professional identity and a strong commitment in her professional work. (8)

No wonder that in the United States, professional women have such a pitifully small representation: only nine percent of the total supply of physicians, 6% of the scientists, 3% of the 'lawyers, 1% of the federal judges, and 0.3% of the engineers are women. In addition, there is a serious economic factor that discourages women in pursuing their studies: the median wage of men is $3,000 more than the median wage of women. In virtually every professional area the differential in median salaries is well over $5,000 - the women being paid less than men for doing the same work. Qualified professional women are not hired for administrative or better paying jobs. Although there are more women teaching on the secondary school level than men, in New

York state's Nassau and Suffolk counties 'there is not one woman high-school principal. Women constitute eighteen percent of the staffs of higher education (most of them concentrated in small 'liberal-arts colleges). Of these, only two percent are professors - the other occupying such sub-professional appointments as instructor, lecturer, and research associate. (9) The seriousness of such obvious discrimination has led the United States Department of Health, Education, and Welfare, (HEW) , to start action against four famous universities to stop such practices against women students and employees under threat' of losing all federal contracts. (10)

All universities make time allowances to men for any period of military service. This is understandable and fair. But no provision is made either on the under-graduate or graduate level for maternity leave. Women either have to drop out of school, or repeat an entire year because they took time out for pregnancy. This kind of callousness is particularly noted in many medical schools. 'Although there is a current estimated shortage of about 50,000 M.D.'s in the United States, medical schools "discourage" married women from entering and flatly reject all applications of women with children as a matter of course. (11)

A nation that is a standard-bearer of such revolutionary and humane ideas as the equal rights and freedom to pursue those paths that yield greatest personal satisfaction and happiness is still neglecting half of its citizens. To ignore the dreams and aspirations of one kind of citizenry in favor of another is unjustified and immoral. No civilized society has evolved through the labors of man alone. "Civilization...occurs in society and all agencies used in the process - language, ideas, knowledge, institutions, property, arts, and inventions - are social products, the work of men and women indissolubly united by the very nature of life..." wrote Mary Beard, and "...an understanding of women's past history in all connections must be regarded, as indispensable to the maintenance and promotion of civilization in the present age." (12)

However, this is not the panacea that will solve the inequity of women's education and achievement in the United States. This is a problem that cannot simply be solved by laws, decrees, and judicial actions. Equality will depend on the changing attitudes of men and women, and these attitudes will evolve only through knowledge and understanding, and acceptance of ethics and morality. Thus, hope for reasonable parity as human beings, self-identity, free opportunity to choose educational experiences,

And professional recognition will depend largely on society's readiness to accept woman on the same terms as man.

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S C 3

QUELQUES ASPECTS DES FEN1TES INGENIEURS PORTUGAISES

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Résumé de la communication

Le but de cette communication est de faire connaitre différents aspects de Ia femme ingénieur au Portugal, soit du point de vue de la formation scolaire, soit de sa vie familiére. On donne aussi quelquer renseignements sur les possibilités a' études aux nlveaux moyens et universitaires - les memes que pour les garcons - aussi que des éléments statistiques concernants le % de filles diplomées par rapport au total de la population étudiante.
Dans la vie professionnelle il n'y a pas théoriquement aucun empêchement pour des emplois, mais, en réalité, les usines, en général privées, n'acoeptent des ingénieurs femmes que pour les laboratoires de controle et de recherche.
A la fin sont analisées les conditions familiéres, économiques, sociales et les possibilités actuelles au Portugal de maintenir un travail hors de Ia maison et une vie de famille; des données statistiques sont presentees.

QUELQUES ASPECTS DES FEMMES INGENIEURS PORTUGAISES

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1 - INTRODUCTION

Au Portugal, comme dans d' autres pays européens, quoique avec un décalage explicable en grande partie par sa situation géogra fique -á la pointe extrême de l' Europe -la femme a cherohé au début de ce siécle sa promotion intellectuolle, s' intéressant á la médecine, aux lettres et, en peu plus tard, aux sciences exactes.. Cependant on ne compte qu' une dizaine de femmes diplômées, dans les domaines ci-dessus désignes, pendant les deux premiéres décades. Quant á la carriére d' ingénieur, malgré un cas sporadique en 1896 et quelques autres beaucoup plus tard dans les années 20 et 30, c'est seulement á partir de 1940 que les jeunes filles, bien que d 'une maniére trés limitée, préparent une école d' ingénieur régulierement.

Il faut encore dire quelque chose sur l' éducation de la jeune fille portugaise. Elle est, d' une maniére générale, élevée selon les norms traditionnelles, se soumettant á une éducation oú la dépendance et la passivité sont prises comme vertus; elle ne peut airisi participer d'une facon valable á la transformation de la société et, ce qui est plus grave pour une carriére technique, développer son esprit critique et créateur. A vrai dire, cependant, depuis 1950 la société portugaise se montre plus ouvert et la jeune fille devient de-plus en plus un être humain, avec ses pleins droits et devoirs.

Voyons, alors, ce que l' on exige de la femme portugaise pour obtenir un diplôme d' ingénieur, comment elle exerce ou peut exercer sa profession et l' incidence que cette derniére a dans sa vie familiale. Les considérations qui vont se suivre sont basées, autant que possible, sur les résultats d' une enquête faite parmi 100 femmes ingénieurs. Le tableau II en résume les aspects les plus significatifs.

2 - FOP11ATION SCOLAIRE

Actuellement, Ie systéme scolaire portugais pour les jeunes se destinant á une carriére universitaire comporte six années d' enseignement Secondaire et deux anneés d' enseignement pre-universitaire, auxquelles fait suite an examen d'aptitude á l' université quand on n' a pas obtenu une classification determinée á l' examen du

"bac". Trés prochainement, li y aura huit années d' enseignement obligatoire.(primaire et préparatoire), deux année d' enseignement sécondaire et denx années d' enseignement pré-univerisaitaire; l' entrée á l' université dépendrat de la classification obtenue á l' examen final.

Bien qu' il existe dans toutes les phases de la préparation scolaire, des établissements séparés pour des garcons et pour des filles, il n'y a aucune différence dans des matiéres en seignées, les connaissances données étant exactement les mêmes. La jeune fille a ainsi une formation, scolaire de base exactemmt identique á celle d' un garcon, ce qui lui permet d'entrer dans n' importe quel cours supérieur sans aucune formation postérieure en plus, de sa formation de base. Le choix de la vie universitaire dépend done essenciellement de l'ambiance familiale, des conditions financiéres et du goût pour l'étude qui est manifesté par la jeune fille.

Au Portugal, il y a actuellement trois écoles supérieurs d' ingénieurs, toutes officielles; deux donnent les titres d' ingenieur Civil, Electrotecnique, Mécanique, de Mines et Chimiste,. et l'autre ceux d'Agronomie et de Sylviculture. Ces trois écoles sont ouverts á la femme portugaise.

Cependant, étant donné que la carriére d' ingénieur n' est pas considérée comme 1a carriére la plus appropriée pour la femme, que les épreuves d' entrée sont difficiles, en particulier dans l' école la plus fréquentée du pays (l' Institut Supérieur Technique), que le cours est long (6 ans) et que l' horaire est trés - chargé, suivre un cours aussi difficile et dont les emplois étaient sûrs pour les hommes et trés incertains pour les femmes, n' étaient pas ,de nature á enthousiasmer les jeunes filles. Ces faits, liés au genre d' éducation de la jeune fille, expliquent pourquoi elle s'est inscrit réguliérement si tard (1940) á l'école d'ingénieur. On remarque encore qu' á partir de 1946, quelques difficultés ci-deasus mentionnées ont disparu et qu'alors on assista á une augmentation importante du nombre des étudiants tant masoulin que féminine Par exemple, en 1966 li y avait 4.386 garcons et 444 filles étudiant dans ces écoles ce qui donne un percentage de filles d'environ l0%.

La figure **I,** concernant l' Institut Supérieur Technique qui prépare des ingénieurs dans cinq spécialités, montre l' évolution dépuis 1940 et l' aocroissement vérifié aprés 1950.

Quant aux motifs qui aménent la jeunne fille portugalse á choisir la carriére technique, une enquête lancée en 1970 parmi les jeunes filles diplômées révéla que leur choix était motivé par un désir de promotion intellectuelle et. que la majorité était mal informée sur le côté professionnel. De même, l'incidence du choix de la spécialité est directement liée á ce manqué d' information. La figure I montre que la plupart a choisi a la

Chimie et l'Agronomie, les croyant des activités essentiellement orientées vera Ie laboratoire.

TABLEAU I

NOMBRE D' INGENIEURS (HOMMES ET FEMMES) EN 1966

spécialités	Homes	femmes
Civil	2.227	13
Electrotechnique	1.168	3
Mécanique	592	1
Chimie	392	61
Agronomie	801	48
Naval	21	-
Geographique	165	18
Mines	180	-
Sylviculture	172	11
TOTAL ….……	5.718	155

Le tableau I, concernant au nombre total des ingénieurs inscrite dans L'ordre des Ingénieurs" (Syindicat Frofessionnel) en 1966, révéle comme les femmes sont attirées por les différentes speoialités. Le pourcentage des femmes est de 2, 6%, pour-centage courant et méme supérieur á celui de quelques pays d'Europe occidentale.

En résumé, nous pouvons dire qu' il n'existe pas une limitation dans l'accés á la carriére, mais une déficiente information sur les possibilités effectives des différents oours d' ingénieurs.

3- ACTIVITE PROFESSIONNELLE

L' éducation donnée, les préjuges et la mauvaise information professionnelle limitent les possibilités réelles de l' activité professionnelle de la femme ingénieur portugaise. En réalité c'est l'employeur qui, á partir de concepts plus ou moins traditionalistes, guide l'activité féminine et non la femme ingeénieur qui effectivement a la possibilité d'opter pour telle ou telle activité qui lui plait Ie mieux ou qui cadre mieux avec sa perscnnalité. Ainsi, le travail de la femme se trouve limité aux laboratoires de controle ou de recherche, aux cabinets

d'études et de planning appartenant aux structures auxiliaires, et á l'enseignement secondaire, moyen ou supérieur. Por contre l'accés aux cadres des entreprises particuliéres, des directions d'usines, aux charges de direction ou de gestion de premier plan, aux places de plus grande responsabilité et de plus grand promotion, aux questions d'orientation, aux projects ou encadremnt de projects de plus grand porté, lui est presque interdit.

Dans le tableau II les résultats concernant ce point sont assez significatifs puisque 80% des femmes employées, le sont dans les services officiels et 78% travaillent dans des laboratoires. Le pourcentage assez bas de femmes dans l'enseignement, 8%, tend á augmenter á mesure que deviennent plus difficiles les emplois dans les laboratoires. Cette situation peut etre consideree essentiellement comme Ie fruit de trois facteurs:

a) défense masculine, quelques fois insconsciente;

b) Ie pourcentage réduit de femmes diplomées .

c) la propre attitude professionnelle de la femme technicienne ou scientiste.

En analysant un peu plus attentivement ce dernier facteur nous vérifions que cette attitude est due á l'éducation recue qui, comme nous l'avons déjá dit, l'incite beaucoup plus á conserver qu' á innover, en inhibant l' esprit critique et créateur que la technique réclame et, aussi, á une absence permanente de stimulation en vue de la promotion de son niveau intelleetuel, d'un meilleur salaire et d'une meilleure qualification. Son travail se limite donc normalement á des fonctions purement exécutives, trés souvent á des travaux qui ne la valorisent pas. L'acceptation de ce role sans indices déclarés de frustation, résulte du, fait que les limites dues á la condition de la femme dans la structure sociale actuelle sont inconsciemment assumées par l'universitaire qui entre dans la vie professionnelle. Acceptant Ie conditionnement féminin et trop prise par les taches domestiques, elle se détourne de l'attitude objective d'intégration dans une ambiance de travail á égalité avec ses collégues masculins. Elle permet ainsi, involontairement, une différenciation qui l'assujettit á des réactions qui limitent sa fixation équitable parmi les cadres supérieurs, en se laissant exclure fréquement. C'est donc sans doute parmanque de conviction qu'elle accepte avec résignation un role sécondaire et exécutif; mais c'est aussi un peu par commodité ,ce qui se justifie en partie par l'exces des pressions familia les, qu'elle se de robe aux taches d'une plus grande responsabl lite qui lui permettraient une promotion professionnelle plus équilibrée dans les cadres techniques.

Cet assujettissement aux conditions imposées par les divers facteurs dont on vient de parler, explique la prédominance, dans le tableau II, de réponses favorables á la stabilité de l'emploi et montrent une certaine satisfaction quant a la nature du travail. Cependant, Ie nombre de réponses défavorabies aux conditions de travail, révéle que, malgré tout, la femme universitaire et technicienne cherche, dans l'activité professionnelle, á mettre en pratique la formation intellectuelle qui lui a été donnée et a participer consciemment au progrés du pays.

Quant á la rémunération et á la promotion dans les places des services officiels, les conditions en sont les mémes que pour les hommes. Cependant, pour la promotion, la femme ne peut pas etre médiocre. Dans les entreprises privées, d'une maniére générale, les salaires des femmes sont inférieurs á ceux de ses collégues masculins, pour les memes activités. En ce qui concerne l'acceptabilité des femmes ingénieurs, elle est raisonnable, dés que le travail soit bien considéré par les hommes et admis par la structure familiale comme étant adapté á la femme.

Ainsi, du point de vue professionnel, la position de la femme ingénieur portugaise, dont l'activité est limitée a certains domaines et dont la promotion est difficile, dépend essentiellement de l'évolution de l'éducation des jeunes des deux sexes ainsi que du changement de la mentalité de l'em ployeur et de celIe de la jeune fille qui doit devenir pro fessionnellement plus consciente.

4 - VIE FAMILIALE

Comme dans n'importe quel autre pays de structure sociale et de traditions identiques, la femme portugaise qui décide d'étre ingénieur, épouse et mére, devra faire des prodiges afin de limiter les préjudices causés par les répercussions de sa vie familiale sur sa vie professionnelle et vice-versa.

Le tableau II nous révéle que 94% des femmes ingénieurs travaillent a plein temps et qu'elles sont en majorité mariées et méres de famille, ce qui veut dire qu'elles out réussi á conjuguer leurs charges d'épouses, de méres, de techniciennes ou de scientistes. Pourtant on ne doit pas oublier que ceci peut s'expliquer par le fait que la plupart a plus de 40 ane et appartient done a une époque ou il était facile de trouver une aide domestique; ce qui permettait l'équilibre désiré entre la vie familiale et la vie professionnelle, bien que ce ne soit pas sans difficultés vaincues chaque Jour. On peut dire encore que, dans la plupart des cas, Ie mari accepte que sa femme ait une activité professionnelle, parce que ceci entrai

ne une augmentation du budget familal. La préoccupation fondamentale est rarement celle de la réalisation professionnelle de la femme ou de sa valorisation personelle. Mais,une fois que la femme commence une carriere, elle la poursuit jusqu'au bout.

En outre, il y a encore les cas, malheureusement assez fréquents, de jeunes diplomées qui sont vaincues par l'atavisme et optent ~our une vie exclusivement domestique.

En autre probléme, est celui des ascendants, vu que l'assistance a la vieillesse est pratiquement inexistente et que l'on commence seulement a debattre le probléme; il se traduit par une surcharge importante pour la femme aussi bien moral que financiére.

Ainsi, Ie domaine familial est celui qui donne á la femme technicienne comme á d'ailleurs toutes' les femmes qui tra vaillent, le plus grand nombre de problemes a resoudre.

Et, pour pouvoir concilier dans l'actuelle. conjoncture la vie professionnelle et la vie fami1iale, il y a un certain nombre de mesures qui, bien qu'elles soient les memes danstous les pays, ont parmi nous une plus grand acuité.

Certainement les changements qui s'opérent dans la jeunesse actuelle, sous certains aspects, faciliteront les táches essentiellement considérées comme féminines, en les répartissant entre les deux responsables de la famille. En méme temps, l'aug mentation du nombre des créches, et des jardins d' enfants ains ne 1a formation de personnel qualifié pourront résoudre quelques-uns des problémes que souléve l'existence des enfants. Il est évident que cette aide ne veut pas dire que ce ne soit pas les parents qui doivent s'occuper des enfants et orienter leur éducation. Elle leurs permet seulement une certaine tranquilité d'esprit pendant qu'ils exeroent une profession, en remplacant les grands - parents ou la vieille bonne, qui n'etait pas, d'ailleurs, toujours de beaucoup de confiance.

L'existenoe d'organisations qui préparent un personnel qualifié pour les services domestiques et la mécanisation d'une grande partie de ces derniers contribueront aussi a une plus grande disponibilite de temps et de détente.

Un autre probléme qui est aussi de trés grande importance, pour nous est celui du recyclage car chaque fois que la femme doit interrompre son activité professionnelle (maternités rapprochées, maladies ou pendant les premiéres années des enfants), elle a des difficultes é se reemployer. Les modalités du travail á temps intégral n'ont pas un grand succés dans notre pays et il ne serait pas profitable pour la femme, puisq 'elle est dans la plupart des cas employée au service public.

Tableau II Résultats d' une enquéte(1970)%

	ge		Etat civil			
	30 ans	- 8		(snas enfants -11		
	30 á 40 ans	- 32	mariée	-73 (1 ou 2 enfants-43		
	40 ans	- 59		(3 ou plus -19		
	s/ réponse	- 1	célibataire	-24		
			divorce	-3		
	Spécialité		Titre obtenu			
	Civil	- 4				
	Electrotechnie	- 1	Jusqu' á 1960	-36		
	Mécanique	- 0	1950/60	-35		
	Chimie-industrielle	- 35	1960/70	-29		
	Géographique	- 12				
	Agronomie	- 36				
	Sylviculture	- 12				
	Début après le diplome		Type d' employ			Stabilié
				Public	Privé	
	Dans l année	-73	Direction	3	3	Dans le l
	1 á 2 année	-13(1)	Projects et			Ploi -61(3)
	3 á 5 année	-4	Planning	6	3	Ayant
	5 année	-7(2)	Recherché	37	3	Change -37
			Services			Inactivité -2(2)
			Techniques	15	0	
			Industrie	1	8	
	Horaire		Laboratoire			Satisfaction dans l' employ concernant
			De controle	41	9	
			Enseignements	8	0	
	Temps plein	-94	Ensemble	80	16	Qualité -78
	Temps partiel	-3	s/ indication	4		Conditions -28
	s/ indication	-3				Ambiance -59
						Salaire -12
						En tous
						Es 4 Aspects -5
						a ucune -8
						s/ indic -2

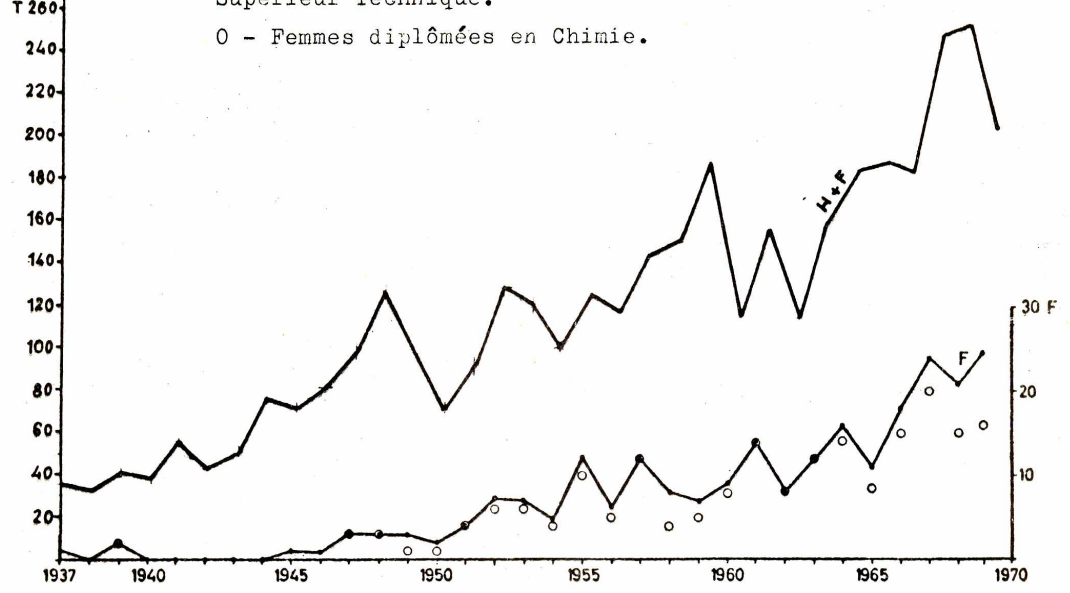
(1) -9% par difficulté d' employ
(2) –pour des raisons personnels
(3) -185 par difficulté d' employ

5 – CONCLUSIONS

En résumé, on peut déduire de l' exposé que, d' une fagon géné rale, la situation de la femme ingénieur portugaise n' est pratiquement pas différence de celle des femmes ingénieurs des autres pays de traditions occidentales mais que sa situation pourrait subir une importante amélioration, en particulier en ce qui concerne sa promotion intellectuelle, si:

- son éducation lui permettait de prendre conscience de ses possibilites et lui developpait sont esprit critique et créateur;
- si l 'information des possibilités professionnelles dans les diverses specialités, était meilleure;
- si elle s'éfforgait d'atteindre ses objectifs par une attitude plus active que passive;
- si elle agissait dans Ie sens d'une répartition harmonieuse des devoirs et des droits dans 1' ambiance familiale et si, au moyen d'aides extérieures, duement organisées, elle réussissait á. atteindre l'équilibre nécessaire entre la profession et la famille;
- si elle cherchait l' organisation de cours de recyclage qui lui permettraient de revenir á la vie professionnelle ou de s' y intégrer quelques anées aprés sa formation, chaque fois qu'elle est obligée d'interrompre ou de ne pas exercer sa profession.

Fig. 1 - Évolution du nombre de diplômés à l'Institut Supérieur Technique.
O - Femmes diplômées en Chimie.



S C 5

PRESENT AND FUTURE OF THE MEXICAN WOMAN

By: Angelina Perez Lopez

* * * * *

BIOGRAPHY:

The author is a graduated civil engineer and bachelor in Psychology. She started studing engineering, in her last year of college she began to work in the design of water supply systems. After graduation she got married leaving the professional activities for several years. After this time she went back to work and she start to study Psychology. During this period she worked half time in the design of hydroelectric power plants. After graduation of bachelor, she founded and directed a firm dedicated to civil constructions. Since that time she is teaching at the University.

She has always been interested in the women's promotion and the problems they face in work and in social life.

SUMMARY:

A revision of the women's role from the last century to our time. Analising the influence of the past two world wars and the changes that are taking place in the women's role due to the evolution of social rights and to the access to heghest educational level. Some groups are taking conscience of their responsibility of guiding other women to reach equal rights and opportunities.

The author is aware that cooperation between sexes is the way to mankind's peace and happiness.

PRESENT AND FUTUTRE OF THE MEXICAN WOMEN

BY Angelina peréz lópez

Fraternity must be possible, must be general, must be permanent.

It is our aim to discover the road and future of the Mexican woman.

In the modern progressive tradition, equality means that all men are equal in reference to those capacities that are the possesion of liberty and happiness; it signifies that no man can be used as a means of another man, no group can be used for the purposes of another group.

Every man is by himself his only object. His goal is the realization of his life, including those pecularities that characterizes him and makes him different from others. Equality is therefore the basis for the development of his in dividuality.

Change is the sign of our time, and the first sign of this change is the acceptance of women' s dignity and her place in society. Up to the last century women have been absent in many human activities. Sex as well as race does not mean a fatality biologically historically or socially. It is only an array of conditions; a reference frame within mankind struggles to reach the full development of its creative potentiality. More deeper than the difference between sexes in the equality between them, because of the fact that man and woman are before any-thing else human beings, participating of the same desires and fears.

The idea that woman must be dedicated exclusively to housekeeping and rearing of children is loosing the force it had, in former generations. In the same way the participation of man in housekeeping is more obligatory. It is true in human society there has been a tendency for the differentiation between the roles and functions that are performed by women and those assigned to men. Although basically there is a simple life system in which it is considered natural that a person thinks, feels and acts in a fixed way according ,to either sex. In most cases this biological difference has been only a pretexe so society according- with its culture and. through diverse institutions had typified the roles and -functions of each sex.

The famous, antropologist Margaret Mead, states that personal features call ed male or females are so, weakly connected with sex as cloths, manners or hair style, that are assumed by each sex according to a particular society and time.

In this paper we shall deal with what we call in Mexico male and female and we shall try to see how far social standards belonging to the traditional culture make emphasis in the differentiation of persons due to social nature, starting from sex. Moreover we want to see if this difference has a static or dynamic character according to the change process that in different fields of life is accruing an a developing society like ours.

In this study we shall consider fundamentaly two autors: Samuel Ramos and , Francisco Gonzalez Pineda, pionners of the study of the Mexican personality.

n general terms, with some variations the characters assumed by both sexes in those works are as Follows:

Man; Individual strong, conqueror, dictatorial, quarrelsome.

Woman; Individual depedent, conformist, routinist prone, shy.

Those characters are formed since childhood. This orientation comes from the mother herself in en emphatic and daily form. She is the one who impresses on her children these characters being herself converted in the first and more -efficient transmitter of social and cultural standards which pretended to carry

The inferior status of women over the following generations.

Although the urbanization process carries on an important dynamic change, at the same time it produces transformations on the whole society, it intends to smooth the difference between the male and female attitudes and opinions. There is a progressive type of attitude that opens the door so it will be permited to women to use her freedom in chosing her way in life. The road is not closed. New perspectives are being oppened, whether men agree with it or not, whether women promote it or not. Society will overcome both.

Statistics for high or university education (thirteen years of studies or more) are the following: 20.8% for men and 6.3% for women. While women's university scope is not a reality, her personal development will be strongly limited .Although in the middle and popular sectors women have reached equal scholarity in grammar and high school, the traditional standard that relegates women's instruction, has not been reached yet. . .

Religion is a significant fact in our subject, when it is identified with a cultural tradition that has made difficult the process of women's development. Most men and women are placed on the traditional position. This is a conception in which the formal ritualism and moralism are considered the most important part of religion. When religion is experienced concientiosly and with responsibility it can not be an obstacle, quite the contrary a religion of contemporary, dimension must be a strong inducement for the development or men and women's entire personality.

At the same time that the country is urbanized, the new generations appear with higher cultural levels. Women accept and aspire to this changes conciously or not. . .

She is not satisfied with her passive role; she wants to participate actively in modern 1ife, in the cultural dimension and also in religion. This fact points out the maturity of her personality that intends to exceed the alignement and conformistic. Situation that tradition garanties for what is called her benefit. we are going to approach the fami1it's institution which is the origin of the transformations that are taking place in women's evolution.

If the family system does not change, women will hardly modify her traditional situation. The study of the family' s evolution is going to be the strategic analysis that will help or prevent that the personal development of women become a reality. Men have always been able to direct their activities in different directions. But women have no option other than maternity. This vocation means a mission performed so many times with merit. However modern life has a plurality of choices for her personal realization.

One of the female's greatest submissions before man has been her sexual subordination.
There is a feeling that only the parents are concerned with the number of children they can have under their responsibility according to their physical and psychological means.

This leads to a new form of life for the couple as well as the family, but even more for the woman who may use her liberty in the selection of her vocation, due to her personal judgement with responsability toward the needs of her family and of the society of which she is an essential member.

Almost all man and woman enter marriage moved by the desire of finding -love satisfaction in a. life with another person. Where life interests, sorrows and happiness will be shared. . .

Although the lack of satisfaction that women find in marriage make us ask ourselves how much has the ideal standards changer in relation with what women ought to be. This change is producing the inadecuacy of a greet sector or women before the cultural standards traditionally established. This brings an important basis for women to dynamice the traditional values, refusing some and managing others for the convinient adecuacy to the society that our coun

Try is producing. .

The Mexican woman will have the opportunity to develope completely. This development will offer her the possibility to fulfill her mission in the society where she belongs. The society needs her and she by no means can be kept out of it. Besides there is an injustice in defruding women. Urgent needs are growing up without finding them any solution. Women represent 50% of the human energy and creative force that traditionally has been ignored in prejuice of the whole human-kind. .

In our days we talk too much about promotion. The promotion of countrymen the promotion of the worker, the promotion of the negro, and the promotion in--general of all human beings that are in one way or in another out of human rights. Although the promotion of women has not been enforced enough, she -formes more than half of the population that is kept out of the decisions in contemporary life.

To obtain the promotion of women there is a need for three actions. The first is the massive improvement of women and their personal awareness of the prevailing situation in the sector that is being devaluated and oppressed.

She must be awakened from the fatalist letharge to a continous form of supration. Even without knowing the final goal, but with the notion that there is always possible to be better and to reach a better development. It is necessary to be in desagreement with the supposed order, to protest to shout that there is a devaluation of the human person, social and psychological alignement. It is necessary to struggle so that abstract equality that is proclaimed be replaced by real equality.

The second step is more showy, but absolutly necessaire. It consists in tearing up the tabus of prejudice and some times of institutions. To brake the barriers, to open the door, to prepare the way, to prepare the new place that will be' occupied by the part of the society that is trying to be promoted.

The human promoter ought to be a technical woman a specialist, a phi1osofer a scientist, as well as a politician and a person of action, She will have to Work day and night, perhaps without seeing .the establishment of the new social stage by which she has worken for.

The third stage of the promotion heeds of an impulse to make the promoted woman to move by themselves to be integrated, organiced and responsible of the new structures prepared for their arrival. This action has the intention that women may supervise, and create new institutions for the solution of the new problems appeared there: they must also sacrificate themselves in taking the responsability of serving others in a more complex and specialized world,

In, Mexico there is discrimination toward women in all circunstances of life. This unfair situation go from the opportunities of reaching a superior cultural lovel up to the right for participating in the decisions that concert them directly. Abstract equality is proclaimed by a society fundamentally male but there is a concrete unequality that blocks all opportunities for women.

Through our history we have elaborated laws that tend to establish the political, economical and social equality between man and woman.

Society offers people more possibilities every time but there is an unfair situation in the way these possibilities are distribuited in the male and female population. Their is a necessity of a double promotive orientation. The first is bettering the human person and the other is oriented toward the reduction of the existing unfair situation.

Woman is not satisfied with her role, the housekeeping load is not shared by man, the economical insecurity, her limitations for developing a lucrative occupation are evident indexes of the in adaptation to her role.

In our changing society, one of these changes must be the women's role. It is going to take a long time to form a new image of the women but is not impossible.

We are living in a rebelious generation, an incipient product of the family in transition. It is evident that an institution that pretends to remain static in a changing society looses its functions, become inept to fulfill its mission and also desappears. It is incongruent to pretend to keep on thinking the same way about the ideal family.

We live in a bussiness masculine society. It means that the executive jobs that have the responsibility of planing the life of the country are in the hands of men. More then half of the population is marginated of the direct Participation in public and private affairs. why does the society disdain the Capacity of women for the performance of multiple functions in its benefit? Why not consider the inmense reserve of women's work capacity?

The greatest revolution that a country can have would be that which modifies the way of living of women. Although a revolution would be peaceful, they would use all means at hand to reach its object. Why do not use all means to reach our aim?

The myth of the traditional standard of the Mexican woman: Humble, patient of abundant fertility, with no interest in social, economic and politic life is ending; meanwhile the image of modern woman with aspirations, rebelious to --- suffering, planning her life, and, willing to promote her development appears vigorous.

Every day a woman gains a battle for the conservation of her personality. A battle that once gained needs inteligence, character and also sherwd and perseverance. A battle that once gained will produce more complete human beings more happy unions, more armonious families, and a country formed by conscientios citizens for whom liberty is the only atmosphere and justice the soil where-they can establish and prospere, and love the indestructible , tie that joins them

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S C 7

THE SOCIAL ROLE OF THE WORKING WOMAN

by Zoya Alekseyevna Yarkova

Biography

Candidate of Historical Sciences, sociologist, senior scientific worker at the Scientific-Research Institute of the USSR Academy of Sciences, Member of the Soviet Women's Committee.

Summary

The report poses the question of what her social relations; her active participation in all spheres of the life of society has on the forming of a woman's all-round development as an individual. Special attention is paid to woman's participation in social production. In this connection the author speaks of the results .of the socio-economic policy of the Soviet Government, directed towards drawing women into social production. The report gives a picture of female labour in the USSR, its structure; special attention is paid on the quantitative changes in the utilization of female labour which has great significance when characterizing the social role of women. The question of women's new role in the family which is in full accord with her modern role is examined. Further, the author shows the role the Soviet Government plays in the creation of conditions that allow women to combine their role as a working woman, mother and citizen; in this connection she speaks of the new perspectives which open up before the Soviet women in the Ninth Five-Year Plan of the development of the national economy of the USSR.

SOCIAL ROLES OF A WORKING WOMAN

By Z. A. Yankova

The image of the woman of the future - is the image of a woman thoroughly developed, creative and socially active. The richness of her personality is determined firstly by the depth and versatile character of her social connections, her creative and active participation in all spheres of public life. That is why work, personal contact and knowledge are those conditions in which her formation takes place, those prerequisites thanks to which her genuine equality with man is realized. Of particular importance among them is the participation of woman in social production.

F. Engels once wrote that the emancipation of woman will be possible only when she will be able to participate in production on a mass social scale, and her housework will take up only a small amount of her time. This principle was consequently worked out by V. I. Lenin and his collaborators and was the basis of the policy of the Communist Party and the Soviet government in solving the women's problem in the USSR. According to Article 118 of the Constitution of the USSR, women together with men were given the equal right to receive guaranteed work according to their speciality with pay corresponding to their quantity and quality.

As a result of the social and economic policy of the Soviet state, the specific weight of women in the country's economy has increased from year to year. If in 1940 the specific weight of women to the total number of workers and employees was 39%, in 1950-47%, then in 1970-51%.

To have a characteristic of women's labour it is insufficient to name only the quantitative indices, it is most important to have a qualitative characteristic of this work.

Women in the USSR are employed in all branches of the national economy (in industry - 48% women, agriculture - 42%, communications - 67%, trade 75%, public health - 85%, education and culture - 72%, in the arts - 42% etc.).

The specific weight of women employed in mental work in our country is increasing more rapidly than in the sphere of manual labour. The specific weight of women employed primarily in physical work increased by only 1% (from 45% to 46%) for the period 1939-1959, while those engaged in mental work increased by 21% (from 33% to 54%).

Many women are engaged in highly - qualified work connected with the organization and management of production. Over 500,000 women are directors of industrial enterprises, state farms, administrative establishments, chairmen of collective farms.

Every third engineer in the national economy of the USSR is a woman. And in industry 46% of all engineers are women. Women engineers are employed in the most diversified branches of the economy, beginning with "traditionally female" establishments such as textile and ending with the most modern branches of industry (electronics, electrical engineering etc.), which were recently created as a result of the scientific and technical revolution.

In the Soviet Union over 300,000 women or 39% of the total are scientific workers. Among them are women academics, corresponding-members of sciences, professors, assistant professors. Their scientific activities are the most diversified, and their contribution to the development of literally all branches of science is stupendous. All this goes to show, that women in the USSR have not only achieved juridical equality with men but also factual equality. All this proves public recognition of their knowledge and experience, their high social prestige.

According to the data of a random sociological study, approximately 80% of the women questioned consider their production role as being of the utmost importance. They noted that creative labour and organizational activity in the sphere of social production not only raises their social prestige, but also their family repute, helping to create equal relations at home.

Around 94% of the respondents noted a simultaneous need for public activities (participation in production meetings, public control etc.),which helps the employee to get better adapted to her profession and job, to her workmates and in this way, to better fulfill her production role. Mixed teaching of boys and girls, men and women according to a common curriculum by highly-qualified specialists in our country helps women to receive better training for production work.

Girls make up 48% of the student body of all the diversified higher educational establishments in the USSR and 34% at the technical colleges and universities. The registration of the needs of the national economy, labour reserves, and also the state policy directed at ensuring genuine equality of women and men, create favourable conditions for preparing girls for professional work. In order to realize this a wide network of special secondary schools has been established, also vocational-technical schools, various refresher courses at the enterprises and establishments, and factory and-workshop training. Various courses: production-technical, special purpose, progressive experience, second profession have been organized at the enterprises, for already working women. While attending these extension courses the woman does not work but her salary or wage is retained. Classes at these courses make it possible for the woman to master new equipment, to raise her skills and professional know-how in a very short period of time. Working women can receive a general and special education without leaving

Work at evening and correspondence courses at general and special secondary schools, the state stimulate such education by granting large privileges to those who study while working.

This is especially important during the period of scientific and technical progress which requires a further rise in the qualification and growth of the cultural-technical level of all workers, both men and women.

Already now, the level of professional knowledge among Soviet women is not lower, but in many cases much higher than among men. For example, the number of women specialists with a higher or special secondary education engaged in the national economy has reached 8 million persons or 58% of the total number of specialists. Sociological studies have found that there is a large number of families where the wives have a much higher educational level and social status, - a phenomenon unheard off in the past.

A random sociological investigation has noted that the overwhelming majority of able-bodied women are striving to work in social production regardless of the presence or absence of children.

For instance, the model "to work until childbirth and after they are grown-up", was turned down by 98.5% of the respondents.

In their criticism of this model the women noted, that 10-12 years of a forced interruption in their working career in bringing up two children will undoubtedly have a negative effect on their working ability and also on their upbringing functions and relations in the family.

What are the conditions created by the Soviet state so will not be torn away from her professional activities for due to childbirth?

Motherhood in the USSR is recognized as a social function of woman. We have a system of maternity care in our country by which, in particular, women receive paid pregnancy and birth leave in the course of 16 weeks. After birth the woman retains her workplace and seniority for one year if she does not wish to work. A working woman has additional breaks to feed her child. A special labour law exists for pregnant women and nursing mothers etc.

Childcare, especially infants, is an acute problem for working mothers in many countries.

In the Soviet Union, the state takes upon itself the greater responsibility in the care and upbringing of children. It systematically expands the network of pre-school establishments and subsidizes them.

At present over 9 million children attend nurseries and kindergardens which function the year-round; over 4 million children go to seasonal children's pre-school establishments during a period of 5-9 months, mainly in the summer, when field work is at its peak on the farms.

The new Five-Year Plan for the development of the national economy of the USSR (1971-1975) envisages a further increase in the number of places in pre-school establishments by another 2 million.

Children's pre-school establishments are highly popular among the Soviet people, not only because they give the women an opportunity to take an active part in the life of society, but also because the child receives all-round development in them.

At the same time, public upbringing of a child certainly does not contradict family education. According to the majority of the respondents, socialization of a child is of the most optimum in character, if it is carried out with the joint efforts of the family and society as a whole.

Millions of junior schoolchildren have the possibility to remain after studies in the groups of so-called "prolonged-day" at the school. They have their lunch there, rest and do their homework. The Ninth Five-Year Plan envisages an increase in the number of places in the groups of the prolonged-day by another 1.5 million.
.

Of priceless assistance to the parents in bringing up school children are the extra-scholastic children's establishments: pioneer palaces and clubs, children's parks, theatres, technical clubs, libraries etc.

In examining the question of the formation of the woman's personality, her social roles, it is also necessary to examine in detail her everyday role.

Soviet women give major attention to their everyday life. Asked what role they consider to be the main one: social or everyday family? - The greater majority replied: "Both". The respondents feel that both are necessary for the society as a whole, the family and the women themselves: both roles form them as a personality.

It should be noted in this connection, that as sociological data have shown, the present everyday role of a Soviet woman differs in its character and content, therefore it has a different influence on the structure of her personality and consequently on the process of realizing factual equality of woman and man.

In the complex continuum of everyday roles, some of them enhance the formation of an all-round developed, creative; socially active person, others, on the other hand, hinders this process. As a result, some of them augment; others interfere with the process of realizing genuine equality among the sexes. It
is natural therefore, that the woman herself and her family, and society as a whole, are interested firstly, to cut down to the maximum those roles, which interfere with the formation of the personality of the woman and have a negative effect on the fate of the children and the family as a whole.

In a modern family, the duties of the woman are distributed on the socialization of the children, control of their school work, creating a special atmosphere of mutual understanding in the family, working out family orientation, organization of leisure. All these are creative types of household labour.

These new roles of the woman are in full accordance with her present-day social roles. They as the social ones form her as a person, help to discover her creative potential. The appearance of these new roles is proof of the

process taking place of overcoming bygone inequality of woman in everyday life, which leads to the creation of conditions of forming a family of a new type, a collective family, the members of which are connected to each other by relations of comradeship, mutual assistance and mutual understanding.

Together with this, a large part of her free time is given by the woman to low-productive mechanical work in catering to the members of her family. These old, traditional roles of a woman do not form her as a personality, on the contrary they hinder this formation.

The correlation of creative and non-creative types of household work carried out by the woman is changing all the time in building up the first and cutting down the second.

The emancipation of a working woman from the work of catering to the family, mechanization and day services, creating the optimum conditions for family roles - is a long and complicated process, economic and social-psychological prerequisites.

In this connection it is necessary to mention the narrow point of view held by certain scholars who propose the equal division of all inter-family duties between the husband and the wife as the most important measure of alleviating the household work of the woman. In reality this only eases the status of woman in everyday life, but it cannot be the basic factor which revolutionizes everyday life. The obligations in catering to the family are mechanical, non-creative functions which equally oppose the social role of woman and man, equally reduce the budget of free time and therefore, their equal distribution should be considered, although necessary but only a temporary measure until such time when there is complete industrialization of everyday services.

The communist way-of-life presupposes not the equal division of the old roles of the wife with the husband in looking after the family, but the liquidation of these functions as the result of industrializing everyday services.

F. Engels in a letter to Gertrude Guillaume - Chack wrote, that “true equality of woman and man, I think, will be realized only when the exploitation of one and the other by capital will be liquidated, and household work, which is now a private concern will change over into a branch of social production.”

V. I. Lenin and his collaborators often spoke about the necessity of a mass transformation of household work into a large socialist enterprise.

The substitution of household work with public forms of satisfying the material-everyday needs of the family will not break up the family, but on the contrary, will be a factor in its stabilization, will help to form inter-family equality and collectivism.

The question of the mass transformation of petty household economy into a large socialist one in our country began to be solved by the state during the very first years of Soviet government.

The establishment of a wide network of public cafeterias, laundries, dressmaking shops, dry cleaners, clothing and shoemaker shops, production of machines, so-called "minor mechanization" - all this helped to gradually solve this major problem.

An analysis of the time budget of the population shows, that every year billions of man-hours are spent on household chores, where one half of this time goes to buying foodstuffs and preparing the meals. That is why the development of public catering and a more rational organization of sales is of paramount importance.

At present, there are over 230,000 food-catering establishments in the USSR. The network of cafeterias, dining-rooms, factory-kitchens is steadily growing. Together with this, other forms of servicing such as shops with semi-cooked products, household kitchens, sale of hot meals at dining rooms (with a 10% discount) are also being developed. Paramount attention is given to the .sale of semi-finished products at industrial enterprises, especially at those plants and factories employing many women.

Special ministries of public services which guide the everyday services were set up in all our national republics in 1965. Public services in the USSR is transforming into a huge mechanized branch of the national economy. Already now these enterprises offer over 400 different types of services.

The 24th Congress of the Soviet Communist Party held in April drew up major plans of social development. The Congress confirmed once again, that the supreme aim of social production under socialism - is the fullest satisfaction of the material and the cultural needs of the people.

These plans are of special importance to women, as regards their production activity, and increase of their qualification, since a rise in the cultural level depends to a greater degree than men on how good their everyday life is' organized, how much time is cut in doing household work, how high their material incomes will rise.

Together with an increase in wages for their work done, there will be a rise in the public consumption funds.

The socialist society, having in mind the exceptional role of women in the reproduction of the population and the stipulated peculiarities of female labour in social production, gives the women (in per capita of the population) a greater share of the public consumption funds than men - paid maternity and birth leave, greater material assistance to mothers with many children and unwed mothers, medical service to future mothers, aged privileges when receiving pensions etc.

Public consumption funds play a major role in achieving factual social economic equality of women, in creating favourable conditions of combining

Woman's functions of motherhood and social-productive labour.

In 1975, the payments and privileges fromythe public consumption funds will be 90 billion roubles or will grow by 40% compared to the 8th Five-Year Plan. These funds will be used for the further improvement of health services, the development of education and the upbringing of the younger generation. The public consumption funds will help to improve the living conditions of large families and families in the low-income bracket, pensioners, and will expand the privileges of women engaged in production. In particular, the number of paid days for the care of sick children will be increased.

The turnover of public catering will be increased by 1.5 times. Special attention will be given to raising the quality and culture of Public services. It has been planned to increase the production and sale of semi-finished products, semi-backed goods, canned goods and other produce which enhance the preparation of food; to increase the production of packed goods, to develop the practice of ordering produce by telephone, cash-on-delivery and other forms of cultural sale.

Of major importance to women will be the increase in volume of public services which will increase two-fold,

Housing will also be of major importance. The Ninth Five-Year Plan which envisages an increase in housing (565-575 million M^2) will improve the living conditions of approximately 60 million persons. Of major importance will be the further gasification of apartments. In cities and towns it will be brought up to 67-75% and in the rural areas to 40-50%. The use of electrical energy for the public needs of the population will be greatly increased. The advantages of socialism make it possible to direct the natural process of growth of urban development in such a way, that their residents will make use of more healthier and favourable living conditions.

The realization of the Ninth Five-Year Plan will be a major step forward in liquidating the vestiges of the unequal status of women in everyday life, will make it possible to solve the main problem put forward by the Party in this field to give the Soviet woman new possibilities for bringing up her children, to take a more active part in social life, to have more time for leisure and studies, for wider contacts with the fruits of culture.

S D 2

WOMEN AS A MINORITY GROUP - COMPARISON BETWEEN THE U. S. A. AND U. K., PAST, PRESENT AND FUTURE

Evelyn M. E. Murr., -Lenthall, B. Sc., L. Inst. P.

Resume

First-girl Special Trainee at Marconi Wireless and Telegraph Company, Chelmsford, England, and whilst there passed the Ordinary National Certificate in Applied Physics. Graduated in Physics and Mathematics from the University of Southampton, England, in 1963. Worked on the early experiments in the Q-switching of ruby lasers using organic dyes at Technical Operations, Inc., Burlington, Massachusetts; then on methods of testing lens systems using Microdensitometry at Itek Corp., Lexington, Massachusetts. At present, employed by Philco-Ford as a Senior Engineer (specialty Microdensttometry) on the PRESS Program at the M. I. T. Lincoln Laboratory, Lexington, Massachusetts.

Abstract

Women historically have accepted their role as second class citizens. The two world wars brought a change. Many women took on the responsibilities of both home and job. This has led to a wider acceptance of career women up to the point of starting a family. From thereon, society exerts heavy pressures on working mothers. It neglects to even consider the many women who as heads of households support their families by working. .

There is a great need to ensure equal pay for equal work in Britain. Discrimination on the basis of sex is forbidden by law in the U. S. but exists in subtle forms. The inequities of the tax structure for married women working in Britain should be changed. Some legislation is forthcoming: California's community property laws, the revision of abortion, birth control and divorce statutes, are all in the right direction. F or the future, child-ca re centers should be available nationally and universities and technical colleges should plan more refresher courses. More evening-shift work for women, part-time options for all without penalties, here the trade unions could help, and the Equal Rights Amendment to the U. S. Constitution should be passed. These changes can be brought about by people using the enormous power they have to see that the necessary laws are passed and implemented.

WOMEN AS A MINORITY GROUP
A COMPARISON BETWEEN THE U.S.A. AND U.K.
PAST, PRESENT AND FUTURE

By Evelyn M. E. Murray-Lenthall

Although numerically women outnumber men in both the United Kingdom and United States, they have been traditionally treated as a minority disadvantaged group of society. Much of this is still true today despite the increasing importance of the position of women in today's society, and the exciting prospects for the future. This discussion on the existing laws relating to women in the U.S. and U.K. and the proposed legislation which will cause changes in women's position and outlook in society is preceeded by a look at the conditions and needs of women in both countries.

Women have two roles in society today; the first is as a wife and mother, the second as a contributing member to either the labour force or to voluntary work. Some women choose one role only, others both. The latter is a new choice for many, not necessarily present 50 years ago. The underlying reasons why women choose, in many respects, the harder role ridicules the excuses often given for not treating women as equal partner s with men in both the home and at work.

Why Women Work

The female work-force consists of these groups: -

i) Single per sons
ii) Married - husband present
iii) (a) married - husband absent
(b) Divorced
(c) Widowed

Single persons represent 21% of the work force in the U.S., nearly 40% in the U.K. Since the beginning of this century, it has become customary for single women to be self-supporting, and a number are also helping to support one or both parents. Ten per cent of all women do not marry and their work patterns are similar to that of men, in fact their work expectancy of 45 years is two years longer than that of men.

The labour force participation by wives (husband present) is 58% in the U.S. and 5.9% in the U.K. This represents a very large increase since before World War II in both countries. In part, this is due to the earlier age for marriage; most women continue to work until the arrival of the first child, helping to set up the new home. Many return after age 30-35 when the children are in school. With increased life expectancy, a woman of 35 has many useful years ahead of her. In both countries the wife is most likely to be in the work force when the husband's income is in the lower ranges of the middle income levels. As the husband's income increases, few wives work. I would guess that many women whose husbands earn a satisfactory salary are hard-working volunteers in the WVS, Red Cross, etc: so that they are in effect working. The income tax structure in the U.K. is such that it is generally not worth the effort for a professional wife to work if it brings the joint family income above the super tax level. This will partially account for fewer working wives in Britain. In this group, also, are those where the husband is not working -- being either retired or disabled. (These number over a million families in the U. S.) Significantly, 52% of the married Negro women in the U.S. (husband present) expect to work.

According to data collected in the U.S. (March 1966) if the wife worked, the family income was half as likely to be below the poverty line. The added earnings frequently brought the family income above the level called modest adequacy ($7000).

There are 13.36 million women in the U.S. widowed, divorced, separated or the husband absent for other reasons (from 1966 data). In this group we find the greatest hardship. U.S. statistics for 1967 show that 11% of the 47.9 million families are headed by a woman; 64% of these women are in the labour. force, with 1.5 million female heads as sole support of their families. About one third of the families with a female head are in poverty, and a similar situation exists in Britain. A large proportion of these women have young children and if in the labour force, they usually work at least 35 hours a week outside the home.

The Wage Gap

Too many women hold jobs that are far from commensurate with their ability and education. University graduates will be asked, "Can they type?" on applying for a job and are even employed as operatives in factories. For the United States, We see from Table I that the quantity of education received by men and women is not very different up to the graduate level. Yet the median wage for full-time working women is $4457 per annum - 58% that for men.
Investigating these figures further, we have the following:

20% women and 8% men earn less than $3000 p.a.
60% women and 20% men earn less than $5000 p.a.
3% women and 28% men earn more than $10 000 p.a.

If we consider the job classifications for women in Table II and compare it to the education received, clearly women are more likely to be under-employed than men. In the U.K. 77% of the girls leaving school go into clerical, semiskilled or unskilled jobs, women manual workers average half the wages received by men manual workers. As an example, in the professional sphere, only 13 of the 130 Directors of Social Services recently appointed were women; this is in a profession built up by women.

Laws Pertaining to Women

Both the U.S. and U.K. derive their laws from English Common Law. In Blackstone's "Commentaries on the Laws of England", printed in 1756, there is an excellent summary of conditions just prior to the ratification of the Constitution of the United States (1789). Blackstone states that upon marriage, all of the wife's property, including furniture, clothing, jewelry and even her hair became the husband's property. She had nothing to say about her children, her husband could remove them from her care. She could not vote, hold public office, serve on a jury, make a contract or a will, or control her own earnings. The husband had the right to beat his wife - for her protection - she was a chattel and her husband's servant so that he could even sue for the loss of her services resulting from the act of a third party. In 1776, Abigail Adams wrote to her husband, then in Philadelphia, asking that the ladies be remembered in the new Constitution - "Do not put such unlimited power in the hands of husbands", she asks. Her advice was not taken, and the words "people"et cetra in the main body of the Constitution has since been interpreted by the Courts as pertaining to men, as that being the original intent. We have come a long way in 200 years in both countries all women can vote. Nevertheless, many inequalities do exist so that women are not always treated as individuals with respect to the law. This is not such a deprivation to the professional woman, but can be serious

Hardship to those who are educationally or culturally deprived, particularly as they do not always know the rights of redress that are legally theirs.

In the U. K. the convention of marriage is that a man exists in his own right his wife exists only in relation to him. She assumes his domicile and her income is regarded as part of his for tax purposes unless she asks for a separate assessment. She cannot conceal her income from her husband as he must sign her tax return whereas .The reverse is not true when the couple's income enters the surtax bracket. The wife ceases to exist as a separate entity for earned income relief purposes. In most cases he fills in both the returns and signs them, thus recovering any monies due back to his wife. In a survey carried out by the British Federation of University Women in 1959, 54% of the members gave the surtax laws as the reason they did not work.

When two student's marry if they receive grants, that of the wife is reduced as she is regarded as living in her husbands home. A woman requires her husband's written consent in order to have a hystorectomy. Hire Purchase agreements and credit card applications usually require a husband's signature, and often single women are asked to provide a male guarantor. Under Common Law. The father is the sole guardian of his children. A mother can only establish guardianship through court proceedures. Although in the U. S. a child may derive citizenship from either parent, under British Law the child derives his citizenship only through the father. Hence a child with an American father and British mother and born in the U. S. cannot claim British citizenship. Juries are selected on a property qualification and thus few women are called to jury duty.

Contributions to National Insurance for women are 65% that of men and the benefits are correspondingly lower. For example: sickness benefit is 4.50 for men, plus 2 .80 for a wife and 1. 40 for each child. A married woman who has paid contributions at the standard rate is paid 3.50 per week. In the graduated voluntary pension which is based on the pay scale of the individual, a woman must earn 9 a week whereas for a man the figure is 7.50 for each unit contributed to the pension, the reason given for this is that a woman may draw her pension earlier and has a longer expectation of life.

In the United States, due to legislation over the past 10 years, there is less overall discrimination, however; numerous distinctions based on sex do exist, and several of these are called the "Protection Laws". Similar to the 1901 Factory Act in Britain, these laws were originally enacted by the States to prevent the exploitation of female labour. Forty-six states have maximum daily and/or weekly hour limitations. The first enforceable law regulating the hours of employment became effective in Massachusetts in 1879, where large numbers of women were employed in the textile mills and shoe factories. At the time, it was enlightened legislation, today it limits the freedom of an individual to receive overtime pay and promotion. An example of this was a woman known personally by me (she is head of her household) employed full-time by a large Insurance Company. She found it necessary to take a second job in the evenings, requiring considerable waste of time travelling and loss of meal-allowance time in order to make both ends meet. The Company, meanwhile, was employing young men to work overtime, in the same type of work. In Massachusetts, these rules no longer apply to professional women and nurses. Recently, women brought a case in the Federal Courts seeking to enjoin state officials from enforcing the restrictions on hours of

Work, it was brought under the 14th Amendment. The court ruled, however, that the constitutional issue was insubstantial and the three judge court lacked jurisdiction. Other protective laws such as maximum weights that may be lifted, and night work can and, are used by firms to limit the job classifications and hence pay scales for women workers.

Several State Colleges and Universities either exclude women or require a higher standard of admission. Some states restrict the legal rights of a woman some require a married woman to obtain court approval before engaging in an independent business venture. There are still laws giving longer prison terms for women committing the same crime - as there are very few female criminals compared to men, this is a curious attitude.

The different treatment of women for social security purposes was held not to violate the right and due process and equal protection of the laws "The trend of authority makes it clear that the variations in amounts of retirement benefits base~ upon differences in the attributes of men and women is constitutionally valid" yet men and women earning the same salary both pay the same contributions.

There are other inequalities such as a divorced woman has difficulty in obtaining a mortgage or large bank loan as she is considered a "bad risk". Recent and Pending Legislation - United Kingdom

A direct comparison between the two countries is not easy as the problem is being tackled in a slightly different manner. In the U. S., chiefly - fighting by legal process, although some fringe groups keep women's rights in the headlines with somewhat radical behavior. The tendancy in Britain is to use legal means too, but women are forming their own federations to help themselves instead of waiting for attitudes to alter and for men to change the laws. The National Joint Action Campaign Commission for women's Equal Rights arose from the Ford Women's Strike last year. The Women's Engineering Society was formed 33 years before the Society of Women Engineers.

The Equal Pay Proposals for Women (1975) is to prevent discrimination in wages and conditions of employment between men and women. It provides for industrial tribunals to deal with complaints arising on "same work" or job evaluation grounds. It has several weaknesses as a large number of women's jobs cannot be described as broadly similar to men's. It puts the onus on the trade unions to report any discriminatory clauses in basic rates of pay in collective agreements: but women are poorly represented in the unions. For the Trades Union Congress the ratio is 7 to 2, besides which the members of most negociating committees are male.

The Matrimonial Property and Proceedings Act (1970) entitles a woman to claim "lump sums" up to one third of the value of her husband's assets providing that she can prove in court that she has contributed to the value of the property. It has been suggested that as a housewife has nothing that is legally hers, she should be entitled to the personal tax allowance allowed to the husband for his wife, The Women's Taxation Action Group are campaigning for the non-aggregation of earnings and tax relief for domestic wages. Joyce Butler's Private Member's Bill to be introduced earlier this

1. Gruenwald v. Gardner (1968) cert. denied 393 U.S, 982

Year into Parliament would make discrimination against women illegal in employment, education, training and public life and would establish an anti discrimination board to operate in a similar fashion to the present Race Relations Board. Dame Joan Vickers, M. P., Chairman of the Status of Women Committee, circulated a questionaire in the House of Commons since the last election. The results showed that 65 members supported equal pay and equal treatment for men and women. The M.P.s did not wish to end discrimination in job advertising as they considered it would cause bad feelings and be held up to abuse.

The Status of Women Committee is campaigning for the removal of all discrimination against women including equal, status within the marriage. The Abortion Act (1967) does give more freedom to women. The present Government has set up a Commission to study its operation under the leadership of Mrs. Justice Lane, who is England's first woman High Court Judge. The Government plans to provide more money to local authorities for family planning, particularly concentrating on the households (estimated to be half a million) where apathy and ignorance result in unwanted children. During hearings before the Finer Committee on one-parent families, the labour Party urged that existing national insurance cover be supplemented to help these families. Also, local Councils should have the tenancies of council houses jointly held between the husband and wife.

United States

The Fair Labour Standards Act as amended in 1966 extended coverage to a further 10 million workers so that many of the industries with large numbers of female employees are now covered. Not covered under the act are executive, administrative and professional employees, outside salesmen, employees of small retail and service establishments, most farm workers and private household workers. It is administered and enforced by the U. S. Department of Labour. Willful violations may be prosecuted criminally and violators fined heavily. The Equal Pay Act of 1963 applies to all employees covered under the Fair Labour Standards Act. It prohibits employers discriminating in the basis of sex in the payment of wages for equal work in jobs requiring equal skill. Mr. William Brown of the Equal Employment Opportunity Commission in Washington in a talk given to the Electronic Personnel Association for the Boston area said that the amount of money due in back pay as a result of pending court actions was between 20-30 million dollars.

Title VII of the Civil Rights Act (1964) prohibits discrimination in private employment based on sex, race, colour, religion and national origin. It is administered by a five-member bi-partisan Equal Employment Opportunity Commission appointed by the President. It covers the hiring and discharging of employees, unions, employment -agencies, advertizing, apprenticeships and other training programmes. Each employer covered under the act must file an Employer Information Report once a year with the EEOC. Employees are put into one of nine job categories: officials and managers, professional, technicians, sales workers, office and clerical, skilled craftsmen, semiskilled operatives, unskilled laborers, and service workers. The numbers of employees under each category is listed, divided into male and female, then further sub-divided into male and female minority groups (negro, oriental, American Indian, and Spanish surnamed American - of Mexican, Puerto Rican, Cuban or Spanish origin). All employers covered by the act

With 100 or more employees, or those holding Federal Government Contracts, must tile these data every year. The Commission has no independent enforcement power; if it is unable to settle a complaint the aggrieved employee may bring an action in the U.S. District Court under Title VII. The EEOC, however, is determined to enforce Title VII and is not shy of repremanding companies who are not complying, that is, hiring insufficient numbers of women and minority groups in all job categories. Mr. Brown informed the Personnel Association at that same meeting that they fell far below the levels attained by other local industries at all levels.

The Executive Orders of Presidents Kennedy, Johnson and Nixon have extended the prohibition of discrimination on the basis of sex to Federal contractors and sub-contractors and the Federal Civil Service. An interesting result occured recently with Harvard University, one of the largest employers in Massachusetts, being forced by the U.S. Department of Health, Education and Welfare to add more women and non-whites to its 13 000 work force, and to re-evaluate its pay scales as the University receives Federal Government contracts. It was found, for example, that out of 414 full-time tenured professors in the Arts and Sciencies Faculties, two are women; one of these occupies a chair reserved for women!

The Age Discrimination in Employment Act of 1967, which prohibits discrimination against persons 40 to 65 years old, by employers, employment agencies and labour unions, is to the advantage of the mature woman. Several states have recently passed more liberal Abortion Laws and are revising the Divorce Laws.

The most important pending legislation in the U.S. is that of the Equal Rights Amendment which states that "Equality of rights under the law shall not be denied or abridged by the United States or by any State on account of sex". This, through the efforts of Representative Martha Griffiths reached the House floor last year and passed by 350 votes to 15 - the first-time in its half century history that it received favourable action by the House of. Representatives. It was killed, however, in the Senate, by the addition of several amendments including one concerning prayer in schools added by Senator Baker of Tennessee. Senator Sam Ervin from North Carolina led the opposition to its passage. Senator Birch Bayhr and others have promised that the amendment will be re-introduced during the present 92nd Congress. The opposition to the Amendment argue that women do have equal rights under the 5th and 14 Amendments, but several recent court decisions have upheld sex distinctions under the law. In fact, the equal rights amendment, as would similar legislation in Britain, would confer equal rights on both men and women but would not destroy the structure of the family as it would only apply to the rights of the individual under the law.

Birch Bayhr is introducing a bill to provide for the care of children of working mothers, and there is increasing pressure in Congress for widows to receive 100% of the total Social Security benefits her husband would have been entitled to at age 65, instead of the present 82%. There is a bill in legislation in the Massachusetts House to repeal the requirements that pregnant women must quit their jobs - instead they should have the option of maternity leave for four weeks prior to and after the birth, or collect Unemployment Compensation if the job cannot be held open.

Conclusion

Mrs. Ann Blackham, a member of President Nixon's Task Force on Women's Rights and Responsibilities stated "It isn't that women don't want all the niceities of being a woman, they just want equal opportunity to hold public offices." I am optimistic for the future that women will be treated as individuals in their own right. From the results of a survey taken in Massachusetts in March 1971 (Table III), attitudes of both men and women are changing. Women are beginning to discover that politically they have tremendous power, if they choose to use it. If increased career counselling is made available to both the mature woman and the school child as well as satisfactory child-care facilities throughout the United States and Britain, women will begin to see whole new areas opening up where they can serve as equals, achieving by their own inititive. The Honourable Maurine Neuberger, stated however, that "it seems that we are going to have to keep some women's groups going for a while to press for action where We see injustice".

Many exceptional women have attained high goals by their own efforts as illustrated by those present at this Conference. We should, nevertheless, be more concerned for all women. By ensuring that legislation is passed granting equal rights at work and in property we shall ensure greater freedom for both men and women. Perhaps the formation of Trade Unions by and for women would help the less advantaged women workers have a stronger voice. Young women today should be looking forward to lives of variety and richness beyond any of previous generations. If we sit back and settle for the path of least resistance, then women will continue to fill the less satisfying jobs in our society and perpetuate the myth that they are an under privileged minority.

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TABLE I

Educational Attainment of the Population, by Race and Sex, March 1966

Years of School Completed	Men		Women	
	White	Negro	White	Negro
Number (millions)	52.61	5.47	57.97	6.34
Percent	100	100	100	100
Elementary School, 8 years	13.9	12.2	13.1	10.7
High School, 1-3 years	17.8	23.9	18.6	27.1
4 years	30.6	20.3	38.4	23.3
College, 1-3 years	11.5	5.8	10.6	6.7
4 years	7.3	2.2	5.4	2.3
5 years or more	5.0	1.1	1.9	0.9

Source: U.S. Department of Commerce, Bureau of the Census: Current Population Reports, P-20, No.158

TABLE II

Major Occupation Groups of Employed Women, April 1968

Job classification	Number (in Thousands)	Percent Distribution
Clerical	9274	33.7
Service	4300	15.6
Operatives	4125	15.0
Professional & technical (inc: non college teachers)	4016	14.6
Sales workers	1883	6.8
Private household workers	1728	6.3
Managers, officials, proprietors	1202	4.4
Others	1031	3.6

Source: U .5, Department of Labour, Bureau of Labour Statistics

References

Acknowledgement of the information given by The Honourable Mrs. Margaret, Heckler, Member of Congress, and my thanks to Mrs. Ann Blackham, a Member of President Nixon's Task Force on Women's Rights and Responsibilities, who gave me a new insight into women's rights.

United Kingdom:-

(Due to the postal strike I was unable to receive in time much of the more recent data I required.) Equal Pay for Women by 1975 Press release by the Department of Employment and productivity January 1970

National Insurance Information Department of Health and Social Security, December 1970.

TABLE III

Complete equality with men in such things as job opportunities, pay and advancements?

	Total in Mass	City of Boston	Men	Women
Favour	80	85	84	77
Oppose	18	12	15	20
No opinion	2	3	1	3

If your party nominated a women to run for congress from your district, world you vote for her if she was qualified for the job?

Favour	95	94	95	95
Oppose	4	4	4	5
No opinion	1	2	1	0
	1000	506	499	501

Do you think a woman could run a business as well as a man or not?

Favour	60	62	59	60
Oppose	36	34	36	36
No opinion	4	4	4	5
	1000	506	499	501

If a woman has the same ability as a man, does she have as good a chance to become a top executive of a company or not?

Has	36	34	28	45
Has not	61	63	66	54
No opinion	3	3	6	1
	1000	506	6	1

Source: Massachusetts poll, conducted for the Boston globe by Becker Research Corporation.

S D 3

UNITED STATES FEDERAL GOVERNMENT
EQUAL OPPORTUNITY FACTS AND FICTION

RENEE R. STONE

TITLE - Project Engineer, Research & Development; and Equal Employment Opportunity Examiner, Picatinny Arsenal, Dover, N.J.

PRINCIPAL DUTIES AND RESPONSIBILITIES - Technical direction and program management in research & development of defense items. Examiner of Equal Employment Opportunity Grievances, training of management in Equal Opportunity Programs. .

EDUCATION - Bachelor of Aeronautical Engineering, New York University, 1946. Graduate work in Industrial Engineering, New York University, and 1946 - 1948 and at Stevens Institute in Ordnance Engineering, 1965 - 1906. Courses in Production. Management, Technical Personnel Management, Management Communication and Discrimination Complaint Examiner, 1964 - 1970.

AWARDS AND HONORS - Who is Who in American Women, 1965; Zero Defects Award, Picatinny Arsenal, 1965; Letter of Commendation, Picatinny Arsenal, 1966.

AFFILIATIONS - Society of Women Engineers, Armed Forces Management Association, and Morris County Engineers.

PERSONAL - Married, four children, active member of the Experiment in International Living, active in religious & educational organizations.

ABSTRACT

THE PAST - Women have been employed in the Federal Government for almost 200 years. A woman postmaster was appointed in 1773. Years later the Civil Service Act of 1883 permitted and even encouraged women to compete in Examinations on the same basis as men. In 1864, a maximum of $600 a year for female clerks was established; male clerks were receiving $1200 - $1800.

THE PRESENT - Executive Order 11375 banning sex discrimination of 1967, reinforces the intent of Executive Order 11246, which had prohibited discrimination in federal employment because of race, color, religion or national origin.

Primary program efforts have been directed toward three main objectives:

(1) Creating the legal, regulatory and administrative frame work for achieving equality of opportunity without regard to sex; (2) Bringing practice in closer accord with merit principles through elimination of attitudes, customs and habits which have previously denied women entry into certain occupations; and (3) Encouraging qualified women to compete in examinations for federal employment and to participate in training programs leading to advancement.

THE FUTURE - Increasing the understanding at all management levels of the economic advantages of fully utilizing the talent and ability of female employees.

Promoting public awareness of Federal Government opportunities by encouraging women to prepare for all occupations, publicizing achievements of women in top level positions, and building rapport with community organizations and other groups. Developing job design and employment practices which are better suited to women's life styles, such as more part-time employment, maternity leave benefits, and federally sponsored day-care centers. Increasing training and motivation of women through early guidance on occupational choices, job counseling, improved management training and utilization.

UNITED STATES FEDERAL GOVERNMENT EQUAL OPPORTUNITY FACTS AND FICTION

RENEE R. STONE

THE PAST

In the revolution of rising expectations - the struggle for the right to a chance to succeed - decades of silence have been broken by trumpet calls heralding the cause of women, There is undoable more drama and more urgency in the plight of other groups whose place at the bottom of society has resulted in potentially destructive social tensions. Women's place in society and 1n the home may have limited their horizons but it has not generated fears for the stability of society.

American women's participation in the prestige professions have remained constant during the past seventy years, increasing slightly since 1960 through not enough to constitute a change of level. This static condition has persisted in spite of astounding advances in the legal and social position of women in the United States and throughout the world. Women who have chosen careers in the elite professions are as deviant in 1968 as they were in 1898 although the notion of a women doctor or engineer is not as bizarre today as it was then.

Although the number of women in the labor force is enormous - some 28,000,000, and still increasing - women who work have settled for a fraction of the Job possibilities offered by the economy. Only a handful have joined the professions of law, medicine, teaching in higher education, engineering or those linked to the natural sciences as Table 1 shows.

Chronologically, the employment of American Women in public service antedates the United States Government itself. A women postmaster, appointed in 1773, had been in office 14 years when the Constitution was signed. There are .other isolated cases on record of women employed in the postal service in the early years of the Nation, but Government service was almost exclusively. a man's world until the middle of the 19th century.

The Treasury Department made the first major breakthrough between 1862 and 1868 by hiring a number of "Lady Clerks", Prejudice was overcome little by little, not by any theoretical consideration of abstract justice but by the job performance of the women themselves. In 1868 one converted treasury supervisor voiced the conviction of many, that "female clerks are more attentive, deligent, and efficient than males, and make better clerks". The Civil Service Act of 1883 marked the real turning point in Government careers for women. Under the merit system, established by that Act, women were permitted and even encouraged to compete in civil service examinations on the same basis as men, The first women appointed to a civil service position made the highest score on the first civil service examination given in Washington in 1883, and received the second appointment.

Equal pay for women lagged far behind equal opportunity to compete in examinations. In 1864 a maximum salary of $600 a year for female clerks in Government was established by law; male clerks were receiving $1200 to $1800. Six years later, in 1870, a new law gave department heads permission to pay equal salaries to women for equal work, but very few of them chose to do so. Equality of the sexes with respect to pay finally became a reality when the Classification Act of 1923 established the present pay system whereby the salary rate for each job is determined solely on the basis of the duties and responsibilities that make-up the job. The Federal Government was the first among major employers to put into effect the principle of equal pay for equal work.

THE PRESENT

The last legal barrier to full equality of opportunity for women in the Federal service was removed in 1962. The 1870 law which gave agency heads authority to appoint women to the higher clerkships at the same salaries as men "in their discretion" was interpreted for many years as legal authority for them to request only women, or only men, in filling positions. For a great many positions, and for almost all positions in the higher grades, the agencies asked for men only.

A 1962 ruling by the Attorney General, who reviewed the law following a request by the President's Commission on the Status of Women, declared the former interpretation unjustified and invalid. Then in 1965, in order to preclude any possibility of reversion to the previous policy, Congress repealed the law itself. Consequently, Federal departments and agencies may no longer specify sex in filling any but a very few, specific positions approved by the Civil Service Commission. With the removal of this barrier, the framework for true equality of men and women, with respect to opportunity for appointment and advancement in the Federal service, was finally achieved. Executive Order 11375, issued in 1967, reinforced the intent of the Federal Service to achieve equal opportunity for all persons by adding sex to existing Executive Order 11246, which prohibited discrimination in Federal employment because of race, color, religion or national origin. This amendment gave the Federal Women's. Program the same emphasis throughout Government as all other elements of the Equal Employment Opportunity Program. It gave clear public notice that the program for women, designated as the Federal Women's Program, is a permanent and integral part of the Government's implementation of the equal opportunity policy enunicated in the Civil Rights Act of 1964.

During the last 18 months, the Civil Service Commission has published a series of guidelines strengthening the Federal Women's Program. The results of this are starting to show in several cases. Significant elements included requirements for a formal agency Plan of Action. The designation of a Federal Women's Program Coordinator in each agency and periodic progress reports to the Commission. At the same time, the commission established an office and staff to provide commission leadership to the program on a continuing basis.

Primary program efforts have been directed toward three main objectives: (1) creating the legal, regulatory and administrative framework for achieving

equality of opportunity without regard to sex; (2) bringing practice in closer accord with merit principles through the elimination of attitudes, customs and habits which have previously denied women entry into certain occupations, as well as into higher-level positions throughout the career service; and (3) encouraging qualified women to compete in examinations for Federal employment and to participate in training programs leading to advancement. Some recent high- 1 lights of the CSC activities in the Federal Women's Program include:

The issuance of program requirements and inspection criteria for agency guidance.

An in-depth study of the statistical reporting systems, resulting in additional data collection and improved analysis and reporting.

Increased emphasis on crediting unpaid/volunteer work as qualifying experience in nationwide examinations,

The publication of "Women in Action", a Federal Women's Program Newsletter summarizing quarterly agency reports of FWP activities.

Studies to find solutions to new problems such as the need for separate maternity leave provisions.

A review of agency outreach methods of expanding recruiting efforts to reach talented women for mid-level and senior-level positions.

A significant increase during 1968 in the number of women employees receiving 8 hours or more of classroom instruction.

Occupational groupings with the largest percentage of women employees (e.g. over 50%) are: personnel management; general administration; medical, hospital, dental, public health; and library and achieves. But a great majority of the women in these occupations remain in clerical and lower-grade technical jobs.

Occupations with the smallest percentage of women employees (under 5%) are veterinary medicine; engineering and architecture; equipment facilities and service investigation and commodity quality control-inspection grading. In some of these fields, e.g., engineering and architecture, there is a special problem because so few women matriculate in these fields in college.

Statistics reveal that in the profile of the Federal work force the largest concentration of women in the lower grade levels and clerical positions, although the total number of women employed continues to increase. A comparison of 1966 and 1968 full-time white collar employment by General Schedule and equivalent grades is shown in Table 2.

In summary, Table #2 reveals:

The 617,220 women employed by the Federal Government on October 31, 1966, represented 33.6% of the total white-collar workforce. By October 31, 1968, the percentage increased to 34.0 percent reflecting the employment of an additional 50,014 women.

Women in grades 1-6 increased by 32,392 or 6.6 percent. This compares with an increase of 4.5 percent of the overall population in these grades.

The number of women in grades 7-12 increased by 23,779 positions or nearly 22 percent since 1966. Total employment in this grade group increased by 16.3 percent during the same period.

Although there was a sizeable percentage increase for women at levels 13 and above (23.1 percent or 1,203 positions), the number employed at these levels still represent about 1 percent of the total women employed in white-collar occupations, as compared to 12.7 percent for men.

Tables 3, 4 and 5 give a breakdown of % of women employed within special categories within occupational groups in the so called elite professions, engineering and science.

THE FUTURE

The 1969 Federal Women's Program Review Seminar brought together 125 participants from 49 government agencies to evaluate program performance and recommended future action and priorities. The delegates provided the **F.W.B.** Staff with the raw materials for many practical and productive endeavors for the near future and identified the following major needs for continuing emphasis and study.

- Increasing the understanding at all management levels of the economic advantages of fully utilizing the talent and ability of women employees.

- Promoting public awareness of Federal Government opportunities for women by encouraging women to prepare for all occupations, publicizing achievements of women in top-level positions, and building rapport with community organizations and other groups.

- Developing job design and employment practices which are better suited to women's life styles, such as more part-time employment, maternity leave benefits, and federally sponsored day-care centers.

- Increasing training and motivation of women through early guidance on occupational choices, job counseling, improved management training and utilization.

You cannot have lived through 1970 and not heard the voices of women clamoring for freedom of choice and equal opportunity, and pushing to amend the Constitution with a phrase that simply reads:

> "Equality of rights under the law shall not be denied or abridged by the United States or by any state on account of sex."

350 Congressmen voted aye and 15 voted no but it ran into difficulty in the Senate. It has been pending for 47 years and we've come so close - the Senate is suppose to reconsider it.

Through all the maze of Congressional Hearings,- Equal Rights Movements and Women's Organizations such as WEAL. (Women's Equality Action League) NOW (National Organization of Women) etc., the progress that has been made ,in equal employment opportunity since President Nixon issued Executive Order 112178 can be summarized as follows:

1. The Commissions organization for equal opportunity has been consolidated and strengthened by the establishment of an Office of Federal Equal Employment Opportunity headed by the Executive Director. In addition, all Regional Directors have been designated as Coordinators for their areas, fulltime EEO Representatives are being appointed in each of the Commissions 10 regional offices.

2. Agencies have been directed, for the first time, to evaluate supervisor£ on their performance in carrying out their equal opportunity responsibilities.

3. Agencies have beep directed to establish incentive programs to reward managers, supervisors, and employees for exceptional performance in providing equal opportunity for all.

4, New EEO training programs for managers are being held by the Commission and Federal agencies, and the Commission is negotiating for two EEO training films to be made available to agencies this year.

5. Federal agencies have been directed to develop specific affirmative action plans for assuring equal employment opportunity for all persons including women. The plans are subject to commission approval and must specify the specific actions to be taken.

6. Directors of Equal Employment Opportunity are now required to take personal charge of the Federal Women's Program in each agency. Also, each agency has beep directed to name a Coordinator for its Federal Women's Program for a Federal Women's Program Committee on the staff of the Director of EEO, to assure that Equal Opportunity is provided for women.

7. A government-wide plan for encouraging upward mobility from lower level jobs is being prepared and will be released shortly to Federal agencies.

Although women's special problems have not been publicized to the same extent as those of other disadvantaged groups, women's position in the occupations may be enhanced by the pressures growing throughout society to grant equal opportunity to all, It is difficult to predict whether the trends toward equality will be stronger than the forces peculiarly inhibiting women in their choice and opportunity of working equally with men at all levels of the occupational hierarchy. Only with a significant increase in their numbers in the male-dominated occupations and with a restructuring of expectations about a women's place in society will women be able to work and compete with men freely at all levels of performance.

TABLE I

Women in Selected Professional Occupations: United States
(Percentage of all workers)

Occupation	1900	1910	1920	1930	1940	1950	1960
Lawyers	-	1.0	1.4	2.1	2.4	3.5	3.5
College presidents, professors, instructors	-	19.0	30.0	32.0	27.0	23.0	19.0
Clergy	4.4	1.0	2.6	4.3	2.2	8.5	5.8
Doctors	-	6.0	5.0	4.0	4.6	6.1	6.8
Engineers	-	-	-	-	0.3	1.2	0.8
Dentists	-	3.1	3.2	1.8	1.5	2.7	2.1
Scientists	-	-	-	-	-	11.4	9.9
Biologists	-	-	-	-	-	27.0	28.0
Chemists	-	-	-	-	-	10.0	8.6
Mathematicians	-	-	-	-	-	38.0	26.4
Physicists	-	-	-	-	-	6.5	4.2
Nurses	94.4	93.0	96.0	98.0	98.0	98.0	97.0
Social workers	-	52.0	62.0	68.0	67.0	66.0	57.0
Librarians	-	79.0	88.0	91.0	89.0	89.0	85.0

Sources: u.s. Bureau of the Census, Census of Population, 1960, Vol. I, Table 202, pp. 528-533. 1900-1950 statistics from U.S. Dept. of Labor, Changes in Women's Occupations, 1940-50, Women's Bureau Bulletin No. 253, 1954, p.57.

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Table2 full- time white collar employment by general schedule and equivalent grades
All Agencies worldwide

Grade A	Employment 31 October 1968 Total	women		Employment 31 October 1968 Total	women		Percent changes Total	women
		Number	%		Number	%		
01	6,560	4,444	67,7	5,041	3,505	69.5	30.1	26.
02	34,454	26,948	78.2	55,811	3,505	80.5	-38.3	-40.0
03	142,177	111,475	78.4	148,472	44,900	75.4	-4.2	,4
04	193,015	145,685	29.1	214,936	111,874	62.7	-10.2	8.1
05	629,486	183,168	50.0	534,561	134,818	28.0	17.8	22.6
06	107,367	53,661	35.5	106,099	149,420	45.7	1.2	10.7
07	154,379	54,866	20.8	132,137	48,472	37.2	16.8	11.6
08	47,053	9,781	23.5	31,252	49,159	25.1	50.6	24.9
09	168,818	39,665	12.3	147,643	7,834	19.7	14.3	36.1
10	26,779	3,295	11.3	21,102	29,151	12.5	26.9	24.7
11	149,390	16,807	6.7	136,868	2,643	9.9	9.1	24.6
12	126,334	8,451	4.2	109,216	13,485	6.2	15.7	24.0
13	90,905	3,824	3.8	78,442	6,814	4.0	15.9	21.2
14	45,588	1,743	2.7	39,741	3,155	3.5	14.7	24.9
15	25,466	695	1.6	20,412	1,396	2.4	24.8	40.7
16	5,907	97	1.6	6,060	494	1.8	-2.5	-12.6
17	2,096	25	1.2	2,391	11341	1.4	-12.3	-26.5
18	1,016	9	,9	622	5	,8	63.3	80.0
Above 18	616	16	2.6	583	11	1.9	5.7	45.5
Upgraded	6,464	2,579	39,9	45,673	9,939	21,8	-85.8	-74.1
Total B/	1,963,870	667,234	34,0	1,837,062	617,220	33,6	6.9	8.1

A/ the grades or levels of the various pay systems have been considered equivalent to specific general schedule grandes scaly on the basis of comparison of salary rates. Specifically, in most instances, by comparing the 4th step GS rate with comparable rates in others pay systems.

B/ Excludes employees of contral intelligence Agency, national security Agency, Board of governors of Federal Reserve System and foreign Nationals Overseas.

TABLE 3 Full time white employment by special categories with in occupational grdjp
Biological sciences worldwide

Category A/	Employment 31 October 1968 Total	women		Employment 31 October 1966 Total	Women		Percent change	
		Number	%		Number	%	Total	Women
Category III								
Gen Biological science	2,492	418	16,8	1,864	369	19.8	33.7	13.3
Microbiology	1,459	400	27.4	1,382	375	27.1	5.6	6.6.77
Pharmacology	211	30	14.2	194	30	15.5	8.8	.0
Agricultural Extension	193	17	8.8	216	23	10.6	-10.6	-26.1
Zoology	142	20	14.1	194	35	18.0	-26.8	-42.9
Physiology	266	40	15.0	270	38	14.1	-1.5	5.3
Entomology	748	15	2.0	700	13	1.9	6.9	15.4
botany	117	25	21.4	117	26	22.2	.0	-3.8
Plant pathology	332	7	2.1	298	8	2.7	11.4	-12.5
Plant physiology	224	6	2.7	199	2	1.0	12.6	200.0
Pi Quarant –pest cont	1,003	9	.9	976	2	.2	2.8	350.0
Horticulture	151	1	.7	144		.0	4.9	
Genetics	149	7	4.7	140	3	2.1	6.4	133.3
Park naturalist	152	7	4.6	133	6	4.5	14.3	16.7
Range conservation	737		.0	858	3	.3	-14.1	-100.0
Soil conservation	4,802	3	.1	4,825		.0	-.5	
Forestry	5,924	5	.1	6,094	10	.2	-2.8	-50.0
Soil science	1,841	1	.1	1,876	1	.1	-1.9	.0
Agronomy	406	2	.5	379	2	.5	7.1	.0
Agricultural management	3,299	3	.1	3,216		.0	2.6	
Genl Fish wildlife Adm	116	1	.9	95		.0	22.1	
Fishery biology	834	9	1.1	799	9	1.1	4.4	.0
Wildlife refuge manage	334		.0	293		.0	14.0	.0
Wildlife biology	604	2	.3	533	2	.4	13.3	.0

TABLE 4

Full-time white collar employment by special categories within occupational GRDJP
Physical Sciences Worldwide

Category A/	Employment 31 October 1968			Employment 31 October 1966			Percent Change	
	Total	Women		Total	Women			
		Number	%		Number	%	Total	Women
Engineering & Architecture								
Category III								
General Engineering	13,061	35	0.3	11,562	30	0.3	13.0	16.7
Safety Engineering	497	15	3.0	437	1	0.2	13.7	400.0
Fire Prevent Engineer	80		0.0	84	0	0.0	4.8	0.0
Materials Engineering	856	15	1.8	811	13	1.6	5.5	15.4
Landscape Architecture	542	9	1.7	480	8	1.7	12.9	12.5
Architecture	1,520	43	2.8	1,428	33	2.3	6.4	30.3
Civil Engineering	17,596	61	0.3	17,562	55	0.3	0.2	10.9
Sanitary Engineering	1,284	7	0.5	1,034	2	0.2	24.2	250.0
Mechanical Engineering	9,521	40	0.4	8,796	34	0.4	8.2	17.6
Nuclear Engineering	1,250	4	0.3	1,009	2	0.2	23.9	100.0
Electrical Engineering	4,587	13	0.3	4,388	13	0.3	4.5	0.0
Electronic Engineering	15,719	69	0.4	13,935	58	0.4	12.8	19.0
Aerospace Engineering	9,493	86	0.9	8,898	80	0.9	6.7	7.5
Marine Engineering	1,043	2	0.2	953	3	0.3	9.4	-33.3
Naval Architecture	1,196	6	0.5	1,045	5	0.5	14.4	20.0
Mining Engineering	456		0.0	434	0	0.0	5.1	0.0
Petro Engr	230	1	0.4	242	2	0.8	-5.0	-50.0
Agricultural Engineer	649	2	0.3	683	1	0.1	-5.0	-100.0
Ceramic Engineering	36	2	5.6	32	0	0.0	12.5	-
Chemical Engineering	1,391	14	1.0	1,326	15	1.1	4.9	-6.7
Welding Engineering	87		0.0	74	1	1.4	17.6	-100.0
Industrial Engineering	2,213	13	0.6	2,089	9	0.4	5.9	44.4
Category Total	83,307	437	0.5	77,302	365	0.5	7.8	19.7
Category II								
Engineering Technicians	27,256	803	2.9	24,235	562	2.3	12.5	42.9
TABLE 5								
Category III								
General Physical Science	6,505	121	1.9	6,227	125	2.0	4.5	-3.2
Health Physics	269	2	0.7	232	2	0.9	15.9	0.0
Physics	6,158	166	2.7	5,531	146	2.6	11.3	13.7
Geophysics	382	5	1.2	353	5	1.4	8.2	0.0
Hydrology	1,061	4	0.4	548	1	0.2	93.6	300.0
Chemistry	8,474	1,314	15.6	8,135	1,252	15.4	4.2	5.0
Metallurgy	697	7	1.0	680	7	1.0	2.5	0.0
Astronomy- Space Science	574	27	4.7	475	34	7.2	20.8	-20.6
Meteorology	2,405	29	1.2	2,257	42	1.9	6.6	-31.0
Geology	1,793	93	5.2	1,949	97	5.0	-8.0	-4.1
Oceanography	721	29	4.0	506	24	4.7	42.5	20.8
Cartography	3,053	282	1.2	2,855	252	8.8	6.6	11.9
Geodesy	376	13	0.4	336	17	5.1	11.9	-23.5
Cadastral Surveying	188		15.6	158	0	0.0	19.0	0.0
Forest Product Technol.	144	3	1.0	125	3	2.4	15.2	0.0
Food Technology	120	23	4.7	110	12	10.9	9.1	91.7
Textile Technology	102	11	1.2	94	9	9.6	8.5	22.2
Photographic Technology	98		5.2	136	1	0.7	-27.9	-100.0
Category Total	33,120	2,129	6.4	30,717	2,029	6.6	7.8	4.9
Category II								
Physical Science Techn.	3,391	670	19.8	3,107	635	20.4	9.1	5.5
Meteorological Technician	2,493	221	8.9	2,380	227	9.5	4.7	-2.6
Navigational Information	533	30	5.6	486	25	5.1	9.7	20.0

SD4

TOWARD EQUAL OPPORTUNITIES - HUNGARIAN WOMEN ENGINEERS

By Zsuzsa Szentgyorgyi

Biography

The author graduated at the Technical University of Budapest in 1958. After graduation she was active as a designer and worked out several industrial devices for automatic control, then she joined the staff of the Research Institute for Automation of the Hungarian Academy of Sciences. At present Miss Szentgyörgyi is working on her post-graduate work.

Her specialised interest is in the field of computing techniques and she deals with software problems Programming languages *I* of computers. She has written several scientific papers and some papers on the role of Hungarian Women Engineers. She is a member of several scientific societies and is on the editorial boards of a journal on automatic control.

Summary

The social transformation taking place after the Second World. War conferred by law full equality of rights on Hungarian women and opened up possibilities for them to continue their studies on any university. They were free to enter technical professions that had been completely barred to them before. However, in so short a time it has been impossible to achieve fully equal rights in practice.

The Organization of Hungarian Women Engineers and Scientists /the MÉNKÖ/ has carried out fact-finding investigations among women with technical degrees. The present paper discusses the preparation of these investigations, the compilation of the questionnaire and the evaluation based on the answers received. Finally, it draws general consequences concerning the further tasks to be done.

TOWARD EQUAL OPPORTUNITIES - HUNGARIAN WOMEN ENGINEERS

by Zsuzsa Szentgyörgyi

1. A BRIEF HISTORICAL SURVEY

In Hungary industrialization started much later than in the USA or in most European countries. This economic - and social backwardness was the reason why greater masses of women took up work in industry only during the First World War /when this was rendered imperative by the shortage of labour/. However, the learned professions and among them first of all technical ones and those involving natural sciences remained closed to women for long. Between the two world wars most graduate women were teachers, in addition to some doctors and chemists. The women engineers working in Hungary prior to the Second World War - chiefly chemical engineers and one or two architects - mostly graduated at foreign universities. About 7-8 % of women engineers working today acquired their diploma before 1944, whereas the diplomas of more than 20% of engineers among men date back to those times fin absolute values the difference is, of course, even greater/.

The social changes and the industrialization of the period after the Second World War created a tremendous want in technical specialists. It was partly due to this and partly to the granting of equal rights that relatively great numbers of women found their way to the universities in a short time. It is worth mentioning that in certain professions, that of pharmacists? Medical doctors and mostly teachers, the balance has got tipped over and the number of women is higher than or nearly identical with that of men. The situation is different with respect to technical professions In the past five years the number of women graduating at technical universities has been almost constant, whereas at the faculties of natural sciences Ito which doctors of medicine and pharmacists belong/ the proportion has risen significantly /Table No.l /.

Thus, when all is said and done, the number of women graduating at technical universities has become constant in the past years; no discrimination or numerus clausus whatever is applied at their admittance to universities. It is interesting to note, on the other hand, that although preferences introduced previously /particularly in the late 'forties/ have been terminated the number of girls admitted to technical universities has not fallen; nay, it has actually somewhat increased.

Considerable numbers of women engineers are working in Hungary; in principle laws ensure full rights for women in work and in the past 20-25 years women engineers, physicists or economists have become customary and accepted. Nevertheless the estimation, advancement and income /for the same work done/ are, generally, not identical in the case of men and women working as engineers |1|.

2. FACT-FINDING INVESTIGATIONS ON THE POSITION OF HUNGARIAN WOMEN ENGINEERS

2.1. The Questionnaire

Thus women engineers working in Hungary have to face problems - sometimes very serious - in their advancement. Some of these problems are such as confront women in general~ providing for the family, giving birts to children, the education of children; others, on the other hand, spring from prejudices still existing and exerting an influence. That is why about two - two and a half years *ago* an organization was created - the Organization of Hungarian Women Engineers and Scientists /the MÉNKÖ / - aimed at giving assistance in these difficulties. /It should be pointed out that SICWES, the lectures and contributions delivered at it, gave a significant impulse. in creating the Organization./ First and foremost, we wanted to get a picture on the general position of Hungarian women engineers, and therefore we carried out fact-finding investigations as our first task. To this end a questionnaire comprising seven great sections of questions with altogether 34 group of questions was issued. The sections of questions were the following;

1. Data on university studies /faculty and time when graduated, average marks achieved in studies/

2. Data on employment /employed at how many places of work, type of working place, kind of assignment/

3. Post graduate studies [knowledge of foreign languages, reading of technical literature, attendance of post graduate course/

4. Advancement /salary; is a women able to produce as results equal to those of a man; can a women advance in this line? /

5. Family and leisure /family status, number of children, the family's effect on the work done; is there any time for pleasure, amusement? /

6. Social circumstances / the income of the family, for what purpose do you save money? /

7. Social activities /have you time, for voluntary work? /

MÉNKÖ operates within the framework of the Hungarian Federation Technical and Scientific Societies /MTESZ/, which has supported the fact-finding investigation too. MTESZ comprises 26 scientific technical societies and the number of its member's amounts to about 1% of the country's population. About 45% of the questionnaires have been filled out and returned; /numerous women engineers enclosed long letters to them/; the evaluation has been performed on grounds of altogether 715 questionnaires.[2]

2.2. Evaluation

Most of the women engineers sending in the answers are young; only 2.5 % of the total number had graduated prior to 1945, their majority 152%/ graduated after 1961. It is not surprising that most of them were good students /there are five marks in Hungary, the best being mark five, whereas mark one means failure/; 77 % of those submitting their answers had achieved an average of 5 and 4 in their studies. This high average may have several reasons: on the one hand only such girls choose technical professions who really feel that they possess the appropriate abilities; on the other hand, the greater diligence and reliability of girls in studying is a well-known fact,. And finally, we think that people who participate in such fact-finding investigations show more interest in things than the average.

However, results achieved in university studies do not have a decisive influence on further advancements: about 20% of quite outstanding students work in subordinate posts, whereas a surprisingly high number of weaker students 110%/ have reached relatively higher, leading positions.

The essence, the core of the fact-finding investigation has been to find out whether women can succeed in a technical career, whether there are factors that may hinder their advancement and if there are such in what way. They make themselves felt. First of all the difficulty appears in the point that "succeeding in a career" cannot be defined in a simple way, for it is a complex notion, not at all unequivocal, On a social level "succeeding in a career" may be tantamount to a leading /or promoted/ position or to an income higher than the average on the given social level. Another, no less important, characteristic should be added to this, namely: to what extent the person questioned is satisfied with her work, whether she likes her profession or not and would rather choose another one,

In answer to the question put in general: "Can a women advance in her line in Hungary?" the majority of those asked gave a definite answer in the affirmative /Table No.2/. This point to the fact that in principle the possibilities are ensured. On the other hand, a closer examination of the factors of advancement mentioned above of reveals that in technical professions women are in a disadvantageous positions in numerous respects, 13 % of those answering the questionnaire work in subordinate positions; only about 10 % are engaged in higher jobs in industry or universities /researchers/, the rest are appointed to lower leading positions /e.g. group leaders/. According to their own judgement the majority of those giving. Answers get a lower salary for than men for the same job /Table No.3/. The number of those who feel that they have a considerably lower salary than men doing the same work is relatively high. In this case, however, the incidental factor may playa part that such as are particularly dissatisfied with their advancement are more inclined to take part in such fact-finding investigations than others, Anyhow, it is a general phenomenon in other

Professions too that women get a lower salary than their male colleagues for the same work, requiring the same responsibility. This difference is but intensified with respect to income because much fewer women can take up secondary jobs than men. And yet a great many of the women submitting their answers feel that their work suits their abilities; lots of them would in any case choose the same profession again; anyway the majority would take up a technical career again /Tables Nos. 4 and 51. It should be pointed out that among those who consider that their salaries are lower, nay, very much lower than the salaries of their male colleagues 48 % would choose the same profession again. This data reflects the fact that with women engaged in technical professions a job is not only a means for earning money, not only an addition to the total income of the family but also a chance to unfold their abilities; it is a vocation which their overwhelming majority would not be willing or able to give up, just as their male colleagues would not do so. This is one of the reasons why the baby-care grants introduced in Hungary could scarcely ease the cares of women with a university degree.

Women with a technical degree adhere to their profession and are of the opinion - in answer to one of the questions - that they are able to produce the same /non-physical! Results as men!. There were only 12 NO answers among the 715/ Most of them 152%! Work in their first jobs, only 7.4 % are at present engaged at their fourth /or more than fourth! Jobs. This, by the way, is not an unconditionally positive phenomenon: it points in certain respects to timidity and to a shirking of a possible risk or uncertainty. Numbers of them continue their studies after graduation at the university: 72.7 per cent of those giving answers have graduated at other similar universities or are studying for such degrees; nearly 10 % /9.6%/ studied or are studying at similar universities and 26.7 % have attended or are attending one post-graduate course or more. Many women engineers know foreign languages. This is of particular importance in Hungary, because the Hungarian language is quite different from languages of great currency and is a tongue spoken by relatively few people only! About 13 millions! In technical professions English, Russian and German are especially important and so is French, though to a somewhat lesser extent. Almost 90 per cent of those returning the filled up questionnaires read or speak at least one language in addition to their mother tongue /Table No. 6/. Many of them read publications on their special line; this proportion fairly tallies with that of men! Table No. 7/.

No doubt the family, pregnancy and, especially, the bringing up of children affects women's careers much more strongly than men's. An American author |2| mentions as a characteristic. Example: if a women working at a university attaches any importance to her advancement, she should bear children is the summer vacation if possible. The same author mentions another disadvantageous factor, which is rather general and occurs not only in the USA but in Hungary too: if husband and wife are employed at the same place /e.g. at the same university /, it is, almost without any exception, the woman who has to sacrifice

Her job on the pretext of a fight against nepotism. It occurs especially frequently that the wife must accept a job disadvantageous for her, or even completely retire for a time, because the husband has been given a commission, an assignment, a fellowship, etc, in a place where the wife cannot get a job suitable for her, although in most technical lines progress is so fast that an absence of two - three years only brings about time-lag that cannot be made up for in most cases. Most of the woman taking part in the investigation are married /76%/ or were married, nearly 60% of the married ones got married only after their graduation; thus the cares of providing for the family did hardly emerge during their time of study. Among the 715 328 /46%/ have no children; about 30% have one child, 21.5 % have two, only 4% have three or more children. On the other hand, it is interesting that the majority of those submitting their answers believe that the family is not detrimental to their work, moreover, a surprising number of views evince that the family promotes their work /Table No.8/. This latter fact may probably be explained by the circumstance that the husband works in a similar or identical field and so they can discuss their problems.

3. CONCLUSIONS

The social transformation taking place after the Second World War conferred by law full equality of rights on Hungarian women. and opened up possibilities for them to continue their studies on any university, Access was given to them to/technical professions that had been completely barred to women. However, as the fact-finding investigation conducted by the Organization of Hungarian Women Engineers and Scientists has evinced there are still a great many problems in realizing equal rights in practice.

One of the fiddiculties is the abolishing of prejudics still prevailing, there are phenomena of discrimination even is such countries as the USA, where women have been working in industry for over half a century. In one of the most up-to-date branch of industry, in computer technique, there are separate adverts 1sments for women and men |3| and |4| - and the jobs for women all belong to lower categories. This is so, in spite of the fact that the branch can pride itself on such names as that of Dr, Grace Hopper or of Jean Sam met. Thus it is understandable that there are such endeavours at discrimination on part of some male executives. MÉNKÖ has staged several lectures and debates on this subject and has invited men running big factories or institutes to attend them. We think, however, that the work of convincing male leaders does not proceed quickly and that there is still a lot to be done. We attach great hopes to the 1970 decisions of the Hungarian Government to solve completely the problems of women. These are long-term decisions, based on the recognition that such a complex problem nurtured by numerous prejudices and wrong customs cannot be fully solved within the lifetime of a single generation. /After 1945 there emerged naive ideas that the question of equal rights for women could be solved

By constitutional measures for good and all. Many failures, nay individual tragedies proved that this approach was untenable./ The attainment of equal rights is a field where legal practice according to Government regulations and to law are factors as important as is that of convincing society. In our view the endeavours of those in charge of Hungary have taken into consideration both factors. One of our tasks is to support the efforts in convincing society.

Of course, the great - but important and fine - burden; giving birth to children and bringing them up remains in existence. The application of household machinery and the extension of the service network have significantly lessened the cares of providing for the family, but in the case of professional women a full solution can be found only if all members of the family land particularly the husband/ take their share in the household work. The pregnancy, and the baby-care in the period after childbirth are at any rate the mother's business /we would hardly give up this!/, but, in the case of two children, this is altogether one and a half - two years at most. To enable an engineer-mother to devote appropriate energy to her work, adequate kindergartens and good day care in schools are to be ensured. This is a problem not completely solved yet in Hungary; the capacity of kindergartens and day schools is insufficient, nor is there enough trained personnel. The above mentioned Government measures are hoped to do away with these difficulties too. Our task is to draw attention to the fact that women in technical professions do not wish to avail themselves of baby care grants, nor are they able to do so because, int he case of two children, an interruption of five - six years would mean a fatal break in their careers. That is why new modes are to be suggested for a solution.

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3. G.H.F.Gardner; The Status of Women in the Field of Computing; Computers and Automation, 1970/Jan., pp.57-58.

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NOTES

By technical we mean - conventionally - the following professions: engineers: mechanical engineers, architects, chemical engineers; civil engineers, mining and metallurgical

Engineers, electrical and electronics engineers and transport engineers; moreover professions in the field of sciences: mathematicians, physicists and chemists.

2. Since we had no lists of women with technical degrees or degrees of natural sciences we sent the questionnaires to the women-members of societies belonging to the MTESZ, to some big factories, research institutes and designing. Bureaux as well as to universities. Thus it happened that the same persons received questionnaires from several places.

3. This extraordinarily progressive social regulation was introduced by the Hungarian Government in 19671 for three years after the birth of their children young mothers can optionally stay at home and receive a grant amounting to about one third of the average income on a national level. During this time their employment relations remain in force.

TABLES

The proportion of women at universities of natural sciences and at technical universities /%/

Table No. l

scholastic year	Natural sciences	Technical University
1965/66	28.6	14.8
1966/67	26.5	14.1
1967/68	32.3	12.7
1968/69	34.5	13.8
1969/70	41.0	16.5

Can a women advance in her career in Hungary?

Table No.2

Yes	No	Sometimes	No answer		
	394	16	274	31	715
%	55.1	2.2	38.3	4.4	100

Is your salary equal to that of men in similar Jobs?

Table No.3

Year of university graduation	It is above it	It is the same	It is below it	It is far below it	No answer given	
No answer given		1	1	-	-	
-1945	2	12	4	-	-	
1945-1950	2	16	7	1	-	
1961-1955	3	57	58	5	1	
1956-1960	4	88	75	6	2	
1960-	2	159	174	29	6	
	13	333	319	41	9	715
%	1.9	46.6	44.6	5.6	1.3	100

Does your work suit your abilities?

Table No.4

	Yes	I would prefer something else	I would be able to do more	It is above my abilities	No answer given	
	472	78	147	1	17	715
%	66	10.9	20.6	0.1	2.4	100

Would you choose the same profession again?

Table No.5

	By all means	Yes	Perhaps	No	No answer given	
	89	369	173	79	5	715
%	12.4	51.8	24.2	10.9	0.7	100

Knowledge of foreigh languages of women in technical professions

Table No.6

Number of languages	1	2	3	4 or more	No answers	
I only read	115	130	39	4	-	
I read and speak	80	125	113	29	-	
	195	255	142	33	90	715
%	27.2	35.7	19.9	4.6	12.6	100

Do you read special literature of your line?

Table No.7

	Hungarian literature	Foreign literature
Regularly	339	263
Sometimes	301	281
No	75	198
	715	715

Effect of the family on your work

Table No.8

	Makes it impossible	Hinders it	Does not in fluence it	Promotes it	No answer given	
	1	143	367	140	64	715
%	0.1	20	51.3	19.6	9	100

S D 6

THE WOMAN ENGINEER IN ARGENTINA

by Tania P. de Cano

BIOGRAPHY

Born in Buenos Aires, Argentina, in 1925; married, two sons. Mrs. Tania Patlis de Cano is a woman Civil Engineer, who has completed her university studies in the Faculty of Engineering of the University of Buenos Aires, in 1953,

She worked from 1948 to 1960 in the National Highway Bureau as designer, and from 1958 in the Faculty of Engineering of the University of Buenos Aires, At present she is Academic Pro Secretary of said Faculty and Partl1er of "1.S, C. ", a consulting engineering firm.

-- S U M MAR Y --

It is evident that woman has a wide field of activity in Argentina, is country which is in the process of industrialization. Work has meant for woman the opening path from the strict family circle upon which argentine society Is based.

By the turn of the nineteenth century the argentine woman begins, to venture in the field of elementary education and by the middle of this century she became the principal element in elementary school and was already predominating in high school.

In the, University field, a three fourth of the student population are men and one fourth are women. Statistics show a considerable increase of female students during the recent years.

Unfortunately the lowest number of women university students is found In the Schools of Engineering.

Nevertheless, the Argentine Woman Engineer has struggled worthily in order to make her Wi3Y in the profession, but she is still far from being i3ble to attain the distinguished positions man has reached in the field of Engineering.

It is evident that woman's potential capacity is equal to that of man, but the opportunities to exercise it are generally denied or not offered to her.

THE WOMAN ENGINEER IN ARGENTINA

by Tania P. de Cano

The position of woman in society has long been considered as a sign of the standard of civilization.

This concept refers to the legal and social status of woman and qualifies society as a whole. Since It determines woman's capability by the positions they reach. As well as the mental and cultural background of man .to recognizes and support this capability using It for the benefit pf all.

Historically, those civilizations where women were more highly esteemed as Individuals, have generally contributed more to the advances of knowledge. Art and of political and asocial organization.

In Babylon under the reign of Hammurabi, In Egypt under the pharaons and at the height of the Roman Empire, women were endowed with the rights to property, Individual freedom and education.

Generally speaking. These rights, lost in the middle Ages. Were recovered in modern times, specially under the threat of industrialized societies.

It would be difficult to a show that industrialization In Itself has caused the change In status which woman holds In today's world. Nevertheless, It Is evident that Woman’s rights and freedom to act as Independent and responsible persons have developed since machines began to take part In Industrial production.

On the one hand, the present Industrial complexity has offered the woman engineer an unforeseen field pf action on the other hand, increasing consumption needs have turned difficult traditional family economy based exclusively on man’s work; unattainable, this fact obliges women to work and work Implies freedom and the need of self-Improvement through studies.

All this process has been accomplished within a short time in an gentina, a country in the process of Industrialization and bettering of its technology and whose standard of living Is constantly improving. It is already evident and definitive that woman In Argentina is having a wide field of activity. Though perhaps this is being accomplished more slowly than in other-countries, Work has-meant for woman the opening path from the strictly family circle upon which argentine society's based.

The belief in woman's economic Insecurity, in woman's sale dependence on man, has influenced fathers so that they have allowed their daughters to further their studies. In the past centuries, these studies were reduced to training woman for the home who could thus offer man a better support and her children a better trainer. Later on, this role is widened to the social aspect and by the turn of the last century, argentine woman begins to venture into the field of elementary school teaching. She quickly advances in this field until she finally outdoes man In It. By 1940 her role as a teacher extends to high school education, a fact showing that woman has acquired a wider and more advanced formation.

We can have an idea of the role of argentine woman in teaching by (he middle of the century by considering data offered by the Ministry of Education as to the sex of teachers in 1958:

Kindergarten	Elementary School	high School	University
female teachers 99,5%	88,3%	56,0%	10,0%

These data show that in the middle of the century argentine woman had already become the principal human element In elementary school, she prevailed In high school and was al ready making headway in university education. These data are similar to those referring to students' sex within the same year. It has been established that there was almost an equal number of male and female students, both In elementary school and high school. At the universities there were 71 % male students and 29 % female students (40.3134 women were taking up university studies in 1958).

The process towards intensifying and widening of woman's field of studies is clearly shown in 1967 statistics. During this year, the percentage of women Increases 35 % (B2.429 women were enrolled in argentine universities). From these statistics we can gather that in the period extending from 1958 to 1967 the percentage of woman university students Increased 71 %, while the percentage of men students only increased' 15 %.

Unfortunately, we find the lowest number of women university students in Engineering. Thus, we see that in 1958 only 2, 4. % of all students, (437) attending the 27 Schools of Engineering in the country were women, and that in 1967 a 4, 05 % (1.207) women students did so. It is evident that the field of Engineering Is largely restricted to men or at least, it is one of the most difficult for women to succeed in it.

It should be pointed out that this predominance of male university students over females is progressively being reduced in the other nine schools of the University of Buenos Aires which do not deal with engineering studies. Seven of them have a majority of male students and three of them have a larger proportion of women students, i.e. Philosophy, and Letters 75, 8% Farmacy and Biochemistry 55, 1 % and Odontology 54, 2 %.

As to the woman engineer in Argentina, even though the first male civil engineer graduated from the School of Engineering in 1870. The first woman engineer graduated as late as 1918 and the second one in December of the same year. The third graduated three years later. Other three years passed until the fourth graduated. In 1929 Argentina had five women civil engineers, the sixth woman engineer graduated in 1937 and seventh in 1941.

Twenty six women engineers graduated from the various schools of engineering of Argentina in 1960, and to put it briefly, we can say that the yearly average of women engineers who graduated during the 1960's was 20. This percentage will probably be increased to 50 % during the 1970’ s.

It should be stated that woman's freedom in America -even In Argentina and in spite of the fact that it is the most European like country of the continent- has been long delayed, if compared with Europe. We can also point out the fact that since Argentina is the country which has not suffered wars, argentine woman has not gone through periods of intense advances, she was not given the opportunity of being needed to the whole extent of her capacity,

An opportunity which was offered to women in other countries. We can remember here, as an example, the statements of Miss Mina Spiegel Rees, first woman elected president of the American Association for the Advancement of Science, when referring to the Second World War, she expressed her views for the New York Times saying: "It was then that many doors opened for -me". - Further more, since argentine society is mainly founded on the family woman's main task and the responsibility arising from it, the time she can devote to work, studies or research, is less than men's even though her capability be considered equal.

Argentine idiosincracy will not accept early independence of its children. It is woman's first task - whether she be professional or not- to educate her children. Gradually the increasing comfort and the establishment of children's care centres are allowing woman to have more spare time for her Intelectual activities.

Argentine woman is conscious that scientific creativity is not a privilege of man; she does not want to lag behind the rapidly advancing technology. She has set forth accepting all her responsibilities, being conscious of her rights. 'She is aware that the woman engineer must not only witness the process of. Development but she must participate as well in the work which' s also her own. to contribute towards the welfare of the inhabitants of the country.

Finally, I must sincerely confess that my personal activity has allowed me to live through what I have herewith expressed. I could add one more experience being married to a professional in the same field and having professional connections enable me to find out what our fell low men engineers think of US women engineers and, of course, which our advantages are over men for the practice of this noble profession, that involves and studies science, art and social environments. The last undoubtedly appeal more to us, to our heart, more sensitive than men's to suffering, poverty and many other problems. Engineering is trying to improve in this restive world which does not seem to find the true path that mankind is so anxiously trying to attain.

Besides. her own experience as an Engineer and In order to offer better foundations for this report its authoress had to do extensive research as to outstanding positions, Important work performed, prizes awarded, as well as high official and private positions occupied by women engineers in Argentina.

From this research it is evident that, although Argentine Women Engineers have struggled very hard in order to make their way in their profession, they are still far from having attained the distinguished positions men have reached in Engineering,

Generally speaking, women engineers have been more successful in the areas of research and In private activities.

Everything points to the fact that women's potential capacity in engineering is equal to that of men, However, In most cases, women are generally denied or not given the opportunities to practice the profession and thus acquire the necessary experience to reach as high positions as men can, In those areas where the physical difference can be overlooked.

I am attempting to show through the increasing advance of woman in engineering studies a deep hope in the future.

SD7

SYSTEMS ENGINEERING - THE FIELD FOR WOMEN?

AGNES A. KAPOSI. Dipl. Ing., C. Eng., M.I.E.E.

The author is a graduate of the Technical University of Budapest.

Her experience includes Industrial research and development in the British Electronic and Computer industries. She has worked as a lecturer since 1964 and is at present a member of the staff of the School of Electrical Engineering Kingston Polytechnic, G.B., engaged in teaching Electronic and Computer Engineering as well as conducting research concerning Computer- Aided Design. She is a partner of Polytechnic Consultants, a firm of engineering consultants.

Mrs. Kaposi is married to an engineer and has two daughters aged 10 and 7 years.

SUMMAURY OF PAPER:

The failure of women to establish themselves in any great numbers in the engineering industries of Western countries is attributed to educational and social causes. Due to tradition and social pressures the technical skill of girls is not allowed to develop in the same way as that of boys and even those girls with aptitude are discouraged to take up careers in technology. The few who train as engineers find less than fair career prospects due to traditional attitudes in predominantly male institutions of industry or research.

It is proposed that the newly developing field of systems engineering provides the opportunities women have lacked so far. Systems engineering demands that engineers should possess mathematical aptitude rather than practical skills; the discipline is akin to mathematics and computing science - fields in which women have proven themselves, have become accepted and have been working successfully over the years; it has not had time to establish restrictive staffing traditions and its expanding demands outstrip all supply, thus offering almost un-limited prospects to anyone with the right ability and training.

This paper will define systems engineering, discuss its function, significance and demands and argue the case for training women systems engineers.

SYSTEHS ENGINEERING - THE FIELD FOR WOMEN?

AGNES A. KAPOSI.

THE SPECIALIST AND THE GENERALIST APPROACH.

As a consequence of the development of technology, in the decades following the second world war undergraduate courses have become more and more specialised,training experts who could efficiently cope with the problems of one particular field of engineering. These specialists were subsequently employed to develop components or products within their field. If they were called upon to design large systems where a variety of specialist knowledge was required, they organised inter-disciplinary teams consisting of experts selected from the appropriate fields. Such interdisciplinary teams encountered nacreous difficulties, caused mainly by communications barriers between specialists of different disciplines. In addition, design optimization was retarded by the lack of ability of any single individual to understand all the problems within the field of each of the experts simultaneously. Thus, the performance of the resulting system was frequently unbalanced, showing the bias of thesauri leader towards a certain discipline.

With the increasing use of computers the size and complexity of systems has greatly increased and the need for competent systems engineers has been firmly established. The systems engineer needed to view the system as an entity of interactive parts, assembled in the interest of satisfactory operation of the whole. While requiring no detailed knowledge of any single classical engineering discipline, the systems engineer had to understand the fundamental principles governing the operation of each sub-system. In addition, he needed skills and techniques to predict and optimize the system performance as the function of the system topology and sub-system hehaviour.

Some practicing engineers, trained originally as specialists, had the natural inclination and aptitude to adopt the necessary generalist approaches. Others set themselves the task to develop a formal discipline of systems engineering, demolishing the classical boundaries between mechanical, electrical, chemical, etc. engineering and developing a system of classifications based on mathematics. Accordingly, systems were classified as stochastic or deterministic; lumped parameter or distributed-parameter; instantaneous or

Dynamic; linear or non-linear. In such terms it became possible to develop homogeneous models or previously inhomogeneous systems, manipulate this model and select the parameters to optimise the performance.

Since the new approach sets out to exploit the similarities rather than the differences between systems or dirrerent classical discipline, it represents a reversal or the post-war trend of specialization; thus, the new approach has been termed "holistic" or "generalist". To promote the approach and provide the necessary training for its would-be exponents, new courses had to be developed and, to quote Professor Linvill of Stanford University, a "new professions" established Some of' these pioneer courses are already in operation. Others are in a state of' planning. The subject matter or such courses contains mathematics, computing science, the formal study of topology and systems analysis. In addition, it contains the study or basic phenomena, permitting the systems engineer to model the components or his systems.

Before accepting the above syllabus as complete, it will be appropriate to examine the design process in the light of the new generalized approach.

COMMUNITY-LEVEL DESIGN.

It is the thesis of' modern design theory that new designs must not only be technically sophisticated and aesthetically pleasing, but also economically viable and socially acceptable. Since high-speed travel and modern communications have strengthened the connections between the sub-systems forming the whole of' the community, the introduction or new sub-systems or modification or old ones will have an effect upon the whole and therefore insular approach of' component-level or product-level design is unacceptable to modern society. Such introspective designs have led in the past to numerous expensive projects and sophisticated technological innovations which the community subsequently rejected. To avoid new calamities of' this sort, the design engineer must be able to view the community as the environment or his sub-system and prepare models which enable him to predict the reactions to his new project. In order to do this, the systems engineer must have understanding or social and economic systems well beyond that or. A specialist engineer. The syllabuses or systems engineering courses must incorporate the teaching or these subjects in sufficient depths to. Allow the systems engineer to model, analyse or design all types or systems, not only engineering systems.

SOCIOLOGY OR TECHNOLOGY?

The designer of a new systems-engineering course must have a taste of his own medicine: - the new course is aiming to change some of the sub-systems of the community; hence the community reaction to the course must be predicted before the new course is launched.

Surveys of undergraduate behaviour have shown that young people the world over are turning away from science and technology and taking an interest in social problems. As a consequence, too many excellent specialist engineering courses are offered to too few prospective students and universities must drop their standards or operate well under full capacity. Subsequent reduction of technological talent will perhaps aggravate the social problems of today, thus establishing a close-loop system on an undesirable course.

The problems of the underdeveloped nations or of urban poverty will not be solved by overcrowding the profession of sociology. The ultimate solution lies in directing the resources of society to develop socially desirable projects. It is hopefully predicted that the systems engineer will have the necessary equipment to help in analysing the problems of the community and also in proposing changes to reduce these problems.

If presented to would-be undergraduates in this way, a course of systems engineering must have considerable appeal. It establishes a link between technology and sociology, harnessing the resources of the former to offer practical Solutions to the problems of the latter

PROSPECTS OF A WOMAN SYSTEMS ENGINEER.

The potential of women to contribute in the systems engineering field appears to be limitless. The field is new and there has been no time to establish male predominance. The talents and aptitudes required are mathematical rather than practical, hence traditional aversions to muddy boots and oily overalls are irrelevant. The success of women mathematicians; physicists, computer scientists and sociologists indicates that similar success is predictable in a field where these disciplines are combined. The demand for trained systems engineers has only recently been realised and is rapidly increasing, there are very few undergraduate courses in existence and thus the demand for new graduates will continue to increase, promising financially rewarding as well as professionally satisfying careers.

S D 8

SIXTY YEARS IN MOTOR ENGINEERING

by Phil Deacon Reeves, M.B.E., F.I.M.I.

Biography

Phil Deacon Reeves is F.I.M.I., Member of the Women's Engineering Society, Member of the Guild of Motoring Writers and Fellow of the Institute of the Motor Industry. She was 3/rd Officer W.R.N.S. 2 years broadcasting with Radio Seac and Secretary of the British European Association of Ceylon.

Mrs. Reeves is First Secretary of Ceylon Road Federation and First Secretary and joint Founder of the Ceylon Society for Prevention of Accidents.

Summary

The 'Sixty' is possibly a misnomer but I was born into the Motor Trade and from the age of two crawled around my Father's Motor Engineering Shop to the dispare of my mother!

Learned to drive inside the works from the age of seven. Cars had starting handles as part of their equipment. Allowed to use starter only at the beginning of journey - engine stalled handle must be used.

Studied Mechanical Drawing at school instead of freehand. Left school and joined Father. Studied for the Institute of Motor Industry Examination and was first woman to pass. Visited Works - Met such people as Seagrave, Malcolm campbell Kaye Don and Parry Thomas - anecdotes of these.

Took up writing for the Motor Trade papers.

Driver in the W.R.N.S. Flag Officer Ceylon's Transport Officer. Motoring Correspondent for Times of Ceylon.

The above outline - when expanded - will include notes of how cars have improved or deteriorated! New view of Women in Motor Engineering etc.

SIXTY YEARS IN THE MOTOR TRADE

by Phil Deacon Reeves, M.B.E., F.I.M.I.

This will be a rambling talk not 'a paper' in the ordinary use of that term, because that is what Motoring was sixty years ago, a ramble along pleasant roads where every other motorist would be a friend in need if you should need help - and motoring being what it was then - you probably would need help.

Perhaps the Sixty Years is somewhat of a misnomer, but I was born into the Motor Trade and we lived in a flat over the Garage. This resulted in. one small girl finding her way into the workshops and crawling around there to her satisfaction and the detriment of her clothes!

Having a large public garage I could learn to drive without going out on the roads and at about the age of seven my particular friend on the staff put me into a car, tied wooden blocks onto the pedals, cushions under and behind me and allowed me to move around the garage. Of course, in those days it was possible to move very slowly without stalling the engine and so the feel of cars grew into me. Even now I might be discovered talking to my car, and I am quite sure that cars respond to those who love them, I'm certain this is a point on which anyone who loves machinery - and presumably that means most of you here today - will agree with me. Cars, engines, machines, all will respond to those who have a feeling for them in a way that they never will for those people to whom these things are pieces of metal and not machines.

At 17, the earliest age for licences in the U.K., I was given a driving licence as a birthday present and taken out on the roads. Cars in those days did have self stutters but they also had built-in starting handles. I was allowed to use the self starter when we began the journey and also if we had stopped and switched off for any reason, but a stalled engine meant getting out and using the handle. With a crash gear box this meant being, very careful indeed. One result is that even today I-double de-clutch when changing down. I know it isn't necessary but by subconscious seems to say take care; you might have to wind up that engine if it stalls!

It had always been agreed that I should be a teacher but I was a year too young to go up to college so I went into my Father's business in the meantime and never left. Instead I became so really interested in cars and the Motor Trade. That I studied for and took the examination of what was then the Institute of the Motor Trade, now the Institute of the Motor Industry. This was the first time I came up against a faint flavour of sex prejudice. No other girls had taken the examination and both my Father and the then Secretary of the Institute were concerned that I might be marked on my sex not on my knowledge. Luckily the Secretary was a very understanding man, though secretly I think he felt I wouldn't pass, and he agreed that e would handle the application for membership himself and would allocate the examination number so that the examiners would not know

Who was sitting? When the results came through the Secretary told the examiners that they had passed 'Ernie Deacon's daughter', not Phyllis Deacon mark you. However I still had to wait for three years before I could be a member of the Institute being too young.

During all this time I was working in my father's business selling cars, mending them and - the best part of all- going down to the factories to collect the new cars. There were no transporters in those days and each car had to be driven very carefully from factory to customer.

Visits to the factories were always interesting, new vehicles to be seen and many famous faces to be attached to names. Those of you who have read of Motor Racing will know some of those names. Henry Seagrave who was the first man to drive a car at the unthought-of speed of 200 miles an hour in a 1,000 horsepower Sunbeam; incidentally I was up at the Motor Show in one occasion with instructions to meet my Father on the Sunbeam Stand, I saw his back in the distance ran up and kissed his cheek and it was Seagrave NOT Father! However he didn't seem to mind and they were wearing similar suits. I met Kaye Don at the Sunbeam Factory when he was being means red for the Silver Bullet attempt on the World record. Malcolm Campbell was a charming man, entirely without pride and rather failing to see why I wanted his autograph at a function when, his words these, "There are lots of famous people here".

Parry Thomas built a Leyland Straight Eight and he took me up the Llanberis Pass, a famous climb in the North Wales, in top gear; never before had I been in a car that did it on better than second with a four-speed gear box.

What with visiting factories, meeting famous people, working in showroom and workshops and passing the Institute's examination I thought I knew something of the Motor business and started applying for work away from home. The invariable reply was "on your qualifications we should be delighted to give you a job - if you were a man".

That answer is always frustrating and there seemed no way round so I began to write about motoring, mostly for the Trade papers, at least they would buy and print what I had to say, even if the theme had to be slanted to what women would like in their cars and how to encourage women to drive more. Incidentally, looking through old cuttings I found an article setting out the need to make sure a driver was suited to the car he or she was buying; suggesting that pedals and steering columns as well as seats should be adjustable and that it was wise to make sure the road was sighted over, rather than through the steering wheel. Early this year I heard a Radio talk in which just those points were all discussed in depth; nearly forty years on it would seem that manufacturers haven't really learnt to adapt their cars to the people who drive them.

Thirty-five years ago I was writing of the need to encourage the motorist to make an appointment for prompt car care, nowadays you won't get a service unless you do make an appointment so that is one way in which the Motor Trade has improved.

When my Father was killed in a Motor Smash, I ran the business for about a year but had neither the capital or - to be honest - the experience to make a go of it. So I looked for other work but this time 'I found someone who was willing to give a woman a chance. This was when I found that I might be able to mend a car but I wasn't very good at selling them, so when a chance came to be one of Britain's first Driving Examiners I applied and, for once, there was no sex discrimination at least on the part of the Ministry of Transport. The prejudice came from those about to be examined neither sex thought much of 'that Woman'. However time was on my side and those in Worcestshire who wanted to pass the driving test had to come to me. I feel that testing drivers is something in which that much maligned attribute, a woman's intuition, can be most useful. There was one driver who seemed to drive very well but with whom I didn't feel at all happy. Having a little time in hand I took him around a few more corners; suddenly he mounted a pavement and drove into a plate-glass window. He was a epileptic, had not declared the fact and had had a minor fit.

Testing drivers might at times be dangerous, it could be difficult and it could be funny. One man, told to turn right at the next - rather large - roundabout said "I ain't going all round that blamed thing". Went to the right and hit a hay cart. On another occasion I suddenly developed lumbago stretched out in the sidecar of a motor cycle being tested. Having failed the driver he wouldn't help me out! And just one more anecdote. A woman driving along a One Way Street at about 15 miles an hour, suddenly swerved to the left and hit a stationary vehicle. Told later that I couldn't pass her, she asked if it was because she hit something. In those days one was not allowed to give the reasons for failure so I said, well yes, amongst other whereupon she said she thought that was mean of me because 'I only hit it once'.

With the outbreak of war in 1939 came the end of testing and all testers were shunted into dealing with commercial vehicle petrol rationing. After a time I managed to leave office work - which I hate - and joined the Wrens as a driver. We drove everything from senior officers to heavy Lorries which was all great fun. Coincidence entered into the “matter at one point. We had to take our Lorries down to a large Bus station to service and wash them ourselves. The first time I went down I was greeted by the foreman with 'fancy seeing you here, you don't want to get yourself dirty just leave your lorry and I'll do it for you'. He had worked for my Father for many years and was an old pal of mine from way, way back.

One of the jobs we had was to take overseas drafts of Wrens down to the main London stations to see them off on the first stage of their journey abroad. On one occasion we were waiting for the train to leave when an American Soldier came up and asked the way to somewhere in the West End. I answered and he gave a startled look, remember that this was in" the blackout, took in my bell bottomed trousers, heavy greatcoat and sailor hat and said "Good God, Lady Sailors how".

But enough of reminiscence, Car have improved enormously in the past sixty years, but there are ways in which there has been rather less improvement than there should have been. Once cars were built to last - witness the old ones that still run well, if you can get the necessary spare parts, nowadays they are made with built in obsolescence. My stepson was recently shown a wonderfully hard smooth surface on metal; it looked like perfect enamel but is scratch proof. Said he 'that should please the Motor Trade', and the answer was 'Oh! No! they won't touch it, it lasts too long!

But cars have improved mechanically, syncromesh has taken a lot of terrors out of driving and automatic gearboxes make the whole thing dull. Cars climb hills in top gear, hills that used to take third, second or even bottom gear. My Father had a favourite tale to tell of having his straw hat blown off when being driven up a steep hill, he was off the car, over the hedge, had retrieved to hat and rejoined the car before it had reached the top of the hill.

It is difficult to remember that cars didn't always have four wheel brakes and that punctures were frequent - tubless tyres being unknown. The earliest puncture proof tyre was a solid band of rubber on a steel rim, and that wasn't much fun at all. When the first Morris Cowley came on the market with four wheel brakes and balloon tyres I was asked by a prospective purchaser if the car had balloon brakes.

As a Wren I went out to Ceylon. and became Flag Officer Ceylon's Transport Officer and at the end of the war I had two years as a full time broadcaster with Radio Seac and also started to "-rite Motoring Articles for The Times of Ceylon. I talk of all this because it does show the value of early training, Knowledge gained can be built on and will always Came to one's aid often in unexpected circumstances, The combination of broadcasting and writing didn't combine under one name. It would never have done for 'Phil' pf Radio Seac to be intelligent enough to know anything about a car except where to get into it. So the writing began under the name of Petroil. My view being that Petrol and Oil are essential for the running of a car so the two were combined in a motoring correspondent’ s name. When asked if I would do. The articles I thought I might manage a column a week for a month, in the event I did a column a week for 17 years and only missed two weeks in all that time.

As a result pf writing I began to learn about roads and their dangers and became the first secretary of the Ceylon. Society for prevention of Accidents. I was allowed a free hand in my column and could be as rude as I liked about drivers and road conditions and I was lucky enough to be listened to and to be of some use in the cause of Road Safety.

You will see that what one starts out to be, is not in the least what one finishes up as doing; but that a determination to have something to do with engineering in one way or another can payoff.

In 1955 I wrote "only a handful of women is at present engaged in the Motor Industry", 36 years later that is only too true if you look at the engineering side but more and more women are connected with the Industry and are concealed with cars, and driving. Almost any filling station is manned by women, or rather very attractive girls. Girls drive delivery vans for anything from clothes. To spare parts and girls are to be found running spare parts departments. Now that is an ideal job for a woman. She is used to having all her kitchen equipment in the right place and to keeping an eye on supplies and carried in to a business this pays dividends.

Cars themselves have really changed very little in basic design. Thet have an engine which has cylinders and pistons and valves and a carburetor, just as they did 80 years ago. The engines perform better and give more power for less horsepower but the basic design hasn't changed. The users approach to cars has changed. In the 1920s Essex advertised their saloon Cars as 'Closed car comfort at open car cost' ; nowadays it costs more to buy an open car than a closed one.

When you buy a car now it may have everything from windscreen washers to rear window heaters; radios, seats that can be turned into beds and draught proof windows. The first car my grandfather bought was to be used in--hilly country so he paid 10 extra for a radiator which was hung underneath at the back!

Looking through an old catalogue for Daimlers I saw that you first bought an engine, then a frame, then you had a body fitted. All the same in the 1920$ you could buy a car called a Beetle for £ 89 so that if some fittings were extra it was still a great deal cheaper than anything that cap. Be bought today.

All this rambling will pave shown you that the basic car has gone on and on, and now is the time that our engineers, preferably with the help of some woman engineers, must turn their minds to designing cars to run on something other than pollutants. And again precedent is to hand. Electric Cars ran early in the century and it should not be beyond the power of present day designers to make an efficient car that will run either on batteries which could be changed or the road, as horses were in coaching days. Or to design an electronic car with batteries so small that spares would be easy to carry. After all in England a large proportion of milk deliveries are made with electric vehicles. Not quite as good as horse drawn ones because it isn't possible to have them answer to a call and follow the milkman around, but still efficient, silent and pollution free.

Perhaps the next International Conference will be able to talk about women's help in preventing Pollution by designing vehicles to use anything other than oil derivatives. This is necessary if we are to continue to be mobile and not to run out of fuel in the not too distant future.

Sixty years with the Motor Industry has shown one thing very clearly, the more things change the more they stay the same. Let us hope that women engineers will show the need for change and will combine to make their wishes felt.