Mahin Kahmann

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WES

THIRD INTERNATIONAL CONFERENCE
OF WOMEN ENGINEERS AND SCIENTISTS

GENERAL REPORTS

Turin, 5 - 12 September 1971

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CONFERENCE GENERAL DOCUMENTS

OPENING CEREMONY

The inaugural session of the Third International Conference of Women Engineers and Scientists took place in the historic hall of Palazzo Madama, where delegates and guests gathered Monday morning, 6th September, 1971.

At the presence of Town Authorities, the Mayor of Turin, Dr.Ing.Giovanni Porcellana expressed the warmest welcome to delegates on behalf of the body of citizens, who follow with interest this important international meeting of women. dedicated to technical and social progress.

Then the President of the Nat. Assoc. of Italian Engineers and Architects,A.N.I.A.I., Dr.Ing. Pietro Giulio Bosisio friendly welcomed world Colleagues.

The Nat. Secretary of A.I.D.I.A., Dr.Anna Amour commemorated with deep regret the late first woman engineer of Italy, Dr.Ing.Emma Strada, first President of A.I.D.I.A., who left with her life a great example.

The inaugural address was given by Prof. Andrea Ferrari Toniolo who brilliantly examined and analysed in five points the deep links existing between technical progress and human progress. He asked the Conference same questions about the five points, concluding with an invitation to further consider the subject presented, in the hope to give an answer at least to some of the questions, which should draw the attention of anyone, not only of women or of engineers. (pages 9,10)

Prof.Rita Levi Montalcini spoke at last about the Woman's Liberation Movement and the substantial contribution that women engineers and scientists can give in helping women to realize the full measure of their intellectual talent and dignity as human beings. (pages 11 - 14)

The Opening Ceremony was conluded with a refined reception offered by the City of Turin in the artistic rooms of Palazzo Madama.

FIAT WELCOME

The augural address of FIAT to delegates was expressed by the Vicepresident, Dr.Ing. Giovanni Nasi, at an exquisite lunch offered in the Historic Museum, after the visit to the FIAT establishments in Mirafiori. (page 15)

ITALIAN GOVERNMENT PARTICIPATION

The final session of the Conference was honored with the presence of the representative of the Italian Government, On.Dr. Vincenzo Russo, Undersecretary to the Ministry of Public Works, who emphasized the concept that to improve the society, a joint action is required, both from men and from women, and that only if men are willing to recognize a position of parity for women, family condition and civil society will advance.on the way to human pregress.

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The I Volume is closed by two final resolutions, the minutes of the International Meeting and the list of participants.

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WELCOME ADDRESS TO WOMEN ENGINEERS AND SCIENTISTS

by Dr. Ing,. Pietro Giulio Bosisio

President of "Associazione Nazionale Ingegneri e Architetti Italiani", **ANIAI**.

It is my privilege to present this selected international meeting the most cordial greeting of the ANIAI, the Association into which AIDIA is included.

My task is a pleasure not only as a dutiful homage to the kind representatives of the fair sex, but also because I am convinced that women's advancsment in those fields which once seemed exclusively reserved to men, is a clear sign of human and social progress. Under a certain viewpoint, you represent today the "Crusades of the XX Century" aiming to open larger fields of activity to women's peculiar pioneering and efficient spirit of realization.

This is not an exaggeration; apart from what a psychologist said that today exaggerations look nearer to reality, the accelerating trend of our world's general process of transformation, the rapid cultural and social evolution, the changes expected in the economical and technological structures of our society, not only favour but demand the insertion of women in scientific and productive processes. By your means women enter into each stage of any innovating process: new ideas, new practical applications and their diffusion into society.

During my long professional experience, in Europe and abroad, I happened to meet your colleagues on work in the most varied fields of activity: from research laboratories to building concerns, from sales to art and public administration, not to speak of others, and I have always appreciated the passion the thoughtfulness, the common sense and the accuracy of performance revealing a doubtless superiority in respect to men's performance.

In the home, for example, the ancestral wisdom and knowledge of the "Queen of the home" in planning the layout of a flat, in organising services and fitting up furnitures, fully show women's practical and experienced superiority.

The fact that some women relatives of mine graduated from the Polytechnic of Milan does not veil my mind; ever since I went myself to the Polytechnic, women colleagues have always inspired me a justified feeling of understanding and admiration ("honny soit qui maly pense") which the passing of time did not lessen. Without doing wrong to my italian colleagues, the working experience I acquired during many months in USSR and in the scandinavian countries has made of me a warm supporter of the unreplaceable contribution of women in the technical and scientific fields.

Moreover, the very interesting list of papers that you are going to discuss, which deal with subjects of extreme actual interest, spanning from technology to sociology, from human contribution to women's particular capacities, are a right proof of my conviction and are also a guarantee of the soundness of your contribution in the many fields of basic importance for the present development of our civilisation, caught in a highly accelerated trend of changes, bringing in a few years unforeseeable transformations.

With this conviction, I am addressing you here with the greetings and good wishes of the ANIAI and mine, all very grateful to the Colleagues who have come from far distant lands to honor with their participation our country, where by old traditions we are always glad to heartily welcome the representatives of culture and of work from all nations of the world.

THE GREAT EXAMPLE OF EMMA STRADA

by Anna E. Amour

The new century had just started when a beautiful young lady presented herself to the Secretary of the Royal Polytechnic School of Turin and asked to be enrolled in a course in engineering.

At the demand, the Secretary bewildered, went to consult the regulations but did not find any clause barring the entrance to a woman. Undoubtedly, no one of the founders of the School of Engineering had ever considered the possibility that a woman could enter the engineering career.

That was how Emma Strada was accepted in the School of Engineering and followed with enthusiasm and discipline the five years of study which until then had been the sole prerogative of men.

In those times Emma Strada went to school in a horse-drawn carriage through streets lit by gas lamps in which a car was a rare novelty. The e1ectricity supply was at its beginnings and the electric light was installed in her home to celebrate her graduation "cum laude" as Doctor in Civil Engineering.

Her career developed at first in two ways, as an assistant lecturer in sanitary engineering and as a designer in her father's "technical office of planning, construction and consulting". She designed and directed the construction of civil engineering works, and of industrial plants not only in Turin but also in other regions of Italy.

To be cited: a funicular railway from Catanzaro Città to Catanzaro Sala, partly running under the foundations of a group of preexistent buildings; a surface water tunnel in the copper mines of Ollomont; the excavation of a gold mine in the vicinity of Monte Rosa; and just before the second World War she studied the project to produce the liquigas from the waste products of refineries. The proces is still utilized in a plant in operation at Marghera.

Emma Strada's career developed however mainly in the field of civil engineering construction, and ended during the second World War when she retired from the construction field and retained only the consulting activity in several industrial companies.

Her example was soon followed by other young ladies who successfully attained the graduation in engineering. Some of them after a few years married and dedicated themselves to family duties, raising the children, then taking care of grandchildren and maybe also giving a hand to help a husband engineer in the exercise of the engineering profession, which for a man seems an obvious choice, while for a woman it still appears unusual if not strange.

But Emma Strada was a rare woman exceptionally endowed with intellectual capacity and clarity of mind, which in her long life experience developed in deep wisdom without lessening her youthful mind and her capability of looking with enthusiasm to life.

She was fond of aerospacial missions and would never have lost a TV broadcasting of astronauts on the moon.

She was the first to consider the possibility of helding in Turin our Third International Conference of Women Engineers and Scientists, she examined estimates and proposals and encouraged with her approval the younger Colleagues to agree to this initiative.

"It is time to demonstrate that women also know how to make themselves useful to society", she said and then she added: "even if I shall not be here any more".

And we are here starting this Third International Conference with the deep regret that she is not here any more, youthful, elegant and wise as we remember her.

We are here planning for progress, and not just the scientific and technological progress which has launched man on the moon or in the infinitesimal secrets of the atoms, but a rea1 full progress that will help men and women to proceed along the way of civilization and to eliminate the dangers of destruction that we are facing because of some unbalanced scientific and technological achievements.

Well, thinking to our theme, to plan for a real human progress, I went to the conclusion that also under this point of view Emma Strada gave us a great example.

After the war, when she had retired from the engineering activity, she had reached a full maturity of mind that was sustained by her youthful strength.

Our country was half destroyed and the way to recovery seemed almost impossible to be reascended and the dissensions incurable.

In these hard days, Emma Strada was the cofounder of a group that assembled, beyond parties, all people faithful to an ideal of civil life, and accepted gladly a post of regional secretary, not to strive for wealth or power, but to make herself useful and to dedicate her experienced capacities to the monarchic idea, which she believed would have been better for her country, with passionate energy.

Faithful, sincere, and disinterested, she fought for that cause, not for her own wealth or success, until the last months of her life.

Maybe we do not always predict in which direction the force of events will push our future, because it is out of the human sight to estimate the full consequences of our scientific and technological progress, but undoubtedly our future will be better if we, men and women, will be willing to think about the common human aspects of our life and let our activity be inspired by the desire of dedicating our efforts to the human progress.

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TECHNICAL PROGRESS, PLANNING AND HUMAN PROGRESS

by Prof. Ing. Andrea Ferrari Toniolo

Professor of Electrical Communications at the University of Rome
Secretary General of the "Ugo Bordoni" Foundation, Rome, Italy.

Forward. Without pretension to giving a complete picture, some considerations are expressed about the fundamental subject proposed, with the aim of introducing various hypotheses or questions, to give the Conference the opportunity of examining critically if it has its own position about the Theme, and of indicating the reasons or the motivations.

First Point. Is the idea of progress only a mental category or one of the effects of the simplifying tendency to reduce everything to a unidimensional system? Among other mental categories of the same kind is the concept of time .For many of us (consciously or subconsciously) the concept of progress can be identified with the passing of time. Another mental category of unidimensional simplification is, for instance, the tendency of evaluating everything in terms of money.There is a connection between the idea of "progress" and of "life" (as for " life “in an elementary meaning. "to make time pass is equivalent to some sort of progress).

Question : Does the Conference have a standing point about the tendency of reducing every thing to a unidimensional order of values? with particular reference to the in terprebtion of reality through the unidimensional unity of "time" or of "money"? Limits and weaknesses of a "progress" intended in a unidimensional way.

Second Point The technical progress can be considered as the expression of a measurable quantity. In a strict sense, this is the measurable progress, while really there are as many kinds of progress as there are many measurable quantities and they make as many different unidimensional systems.

All of these progresses are only increments Which can be recorded. On the whole they seem to constitute a pluridimensional system, while really they are unidimensional and do not constitute a system. Their characteristics are strictly bounded with a typical interpretation of engineering and of science.

Question: Does the Conference have a position about this attitude which makes appeal to an exigency of objectivity and Which breaks down the progress in a multitude of particular progresses?

Third Point Progress can be intended in quality instead of quantity. The distinction is often only apparent because the quality can be reduced to a measurable quantity, as in the second point.

An expression of this attitude is the old habit of considering a man as the hero, the protagonist of history and of progress, the hero which has an excellency of Some quantified quality, which results from the comparison with other men and who becomes a myth to whom are attributed all qualities. This happens today in sport (Which has, in spite of it, many positive sides) and its myths.
If we Want to approach the essential problem of quality we are becoming aware that the stone of comparison is represented by the man in his synthesis not in his analysis. But how? Analysis and synthesis are two different ways of elaborating reality which provide a variety of attitudes and of problems.

Question Is the Conference ready to refuse the hero and his myths and to adopt a position about the mentality respectively connected with the spirit of analysis and of synthesis? and particularly about the creative synthesis?

Forth Point The program (or Project or Plan) is the first form of looking for a synthesis which nevertheless starts from an analysis.
The search of a synthesis is made by man for men (while the increments spoken of in the second points are intended as being distinct from man).
It is necessary to make a distinction among Project, Program and Plan, and the relevant operations.
Characteristics of the Planning are the multiple elements to be combined in a conditioning context.
The program is a network (or a system of equations) with knots (poles) and branches (connections).
The determination of knots is a typical problem of choice, in which the key point is that many possibilities have to be omitted to achieve only one of them .It can be added that the ideal aim is not a uniform distribution, but the opposite. The connections are communications and relationships which are the real human creations.
The development-planning, which is founded on the assumption of a true rationalisation of man should be capable of taking into account also the "metarational" and creative elements of human life (art, religion, politics, etc.). At this point we cannot speak anymore of progress but we have to speak of development.

Question. Is the conference willing to accept the hypothesis of substituting the idea of progress with that of development –planning? Does it have moreover a position about the necessity of poles and connections, that is to say of making choice which at the same imply renounciation ,concentration and creativity?

Fifth point. Assumptions and relative questions. The development-planning to be human must have among other these characteristics:

- it should consider the achievement (life) preerminent above the planning;
- it should not be static, but dynamic (its planning should be continuously trimmed to take into account the variability of external factors);
- it should not provide a prefabricated choice but one vn1ich is the result of the participation of the community and which should imply the acceptance of a discipline, and at the same time it should enhance the personal development in the picture of the planning.

All this indicates the deep links existing among development-planning, participation, human and community achievements, creativity, freedom.
To overcome the antinomy that could take place between personal development? (and freedom) and community planning-development we have to think that the personal development actually derives from assuming and actuating into life communicable and universal values.

Question Does the Conference have a position about these links? Particularly about freedom as an assumption of personal and of community program-development? and about the importance of assuming and actuating into life universal values?

Final consideration. All of the reflections described, however fragmentary and uncompleted should draw the attention of anyone, not only of women or of engineers and scientists.
It has to be hoped that this Conference (or a successive one) will be able to consider the questions presented and give and answer at least to some of them. In any case the questions could be put to the conscience of anyone and there find a profound answer which will give rise to larger contributions and developments.

WOMEN SCIENTISTS AND THE WOMEN'S LIBERATION MOVEMENT

by Prof. Rita Levi Montalcini

Director of the C.N.R. Laboratory of Cell Biology, Rome, Italy.
Professor, Dept. of Biology, Washington University, st. Louis, Mo, U.S.A.

October 1964, three months after the first International Conference of Women Engineers and Scientists, which took place in New York, June of the same year, another Conference was held in cambridge at the Massachusetts Institue of Technology on the topic: Women and scientific professions. At variance with the Conference in New York, with another one which followed in Cambridge, Great Britain in 1967 and with the third which opens today, the Symposium at M.I.T. did not include scientific nor sociological papers, but was of a pure speculative character, with three well defined objectives as stated in the introduction: the first was to acquaint girls seriously interested in a career in science and technological fields with the mythical and actual difficulties that they may expect to encounter and to convey to them that these are not immutable, and that the satisfactions and rewards of such careers are high.

The second aim was to bring together outstanding men and women, active in the fields of education and industry, to focus their attention on the concerns of women preparing for careers in science and technology, in the hope that they may be stimulated to suggest new approaches and discover new solutions to the existing problems, through discussions with the students and each other.

The third aim was to attract the favorable attention of industry, other educational Institutions and the public at large, to the present successful contributions of women in these fields and the desirability of decreasing the present barriers that now prevent maximum utilization of the abilities of qualified women in these areas.

The Conference took place in a dispassionate atmosphere, well fitting to an academic Institution such as M.I.T. and the characteristic of a time which was still not ripe for considering radical solutions to a problem which has plagued mankind or at least half of it and to be exact that part of mankind which consists not of men but of women, for such a long time, that it became customary to accept it as an evil which is a part of the nature of man. Likewise other similar abuses which dishonor mankind such as the exploitation of men by other men, the oppression of minorities on the basis of religious and racial prejudices, the infamy of slavery were accepted by the victims with a passive and hopeless resignation. And yet, in spite of the subdued tone of the Conference, which is well apparent in reading the proceedings which were published in form of a volume one year later, one feels surprised and saddened by realizing that what has been said 7 years ago is still true today in spite of the many events which took place ever since, particularly in these last years, in the hot climate which developed soon after women of all countries joined together under the flag of Women's Liberation Movement.

Perhaps the most impressive of all reports presentel8l is that of the great nuclear physicist Wu Chien-Shiung, who,together with two young associates, had a few years earlier proved that the fundamental law of conservation of parity in quantum mechanics was not valid. Dr. Wu started her report by quoting what had been said 100 years earlier by Matthew Wassar, the founder of the Wassar Women College. The generous endower of that College said that since women have received from the Creator the same intellectual constitution as men, they should have the same right and responsibilities as men to add to the scientific and cultural progress of the world.

" I am sorry to say that we have made relatively little progress since then, said Mrs. Wu. What has contributed to this lack of progress? I sincerely doubt that any open minded person really believes in the faulty notion that women have no intellectual capacity for science and technology. Nor do I believe that social and economic factors are the actual obstacles that prevent women's participation in the scientific and technical field. The main stumbling block in the way of any progress is and always has been unimpeachable tradition".

In support of her contention that women are indeed equally qualified as men for this career and that the lack of women in science is a terrble waste of potential talent, she proudly quoted women's achievements in nuclear physics.It was the well-known discovery of radioactivity by Madame Curie and her husband that made people realize the existence of the nucleus. Madame Curie discovered also and identified several chemical elements and received not one but two Nobel Prizes. "No man in history, commented Dr. Wu, has yet equaled that honor and distinction". Her daughter, Madame Irene Curie Joliot, working in team with her husband, also was awarded a Nobel Prize for their discovery of artificial radioactivity. Coming to times closer to us, another woman, Lise Meitner, contributed greatly to our understanding of the alpha and gamma radiation and together with her nephew, Dr. Frisch, she gave the first explanation of a phenomenon first described by Hahn and Fermi and named by her "nuclear fission". Another woman, Mary Geppert Meyer, was awarded the Nobel Prize in physics for her important contribution to the nuclear shell model.

"Never before - said Mrs. Wu -have so few contributed so much under such trying circumstances".

To the list we must add the name of the same Mrs. Wu and of two other women who were awarded the Nobel Prize: Dr. Gerta Gori for her important discovery in intermediate carbohydrate metabolism and Dr. Doroty Hodgkin for uncovering the structure of Vitamin B_{12} by physico-chemical most sophisticated techniques.

It is of interest to recall that 6 of these 7 women were able to achieve their work, in spite of their family resposibilities as wives and mothers, and it is somewhat amusing the way how one Italian newspaper announced the news that Dr. Hodgkin had been awarded the Nobel Prize in chemistry: "Grand-mother awarded the Nobel Prize".

Dr. Wu ended her report in quoting some depressing figures published in 1962 by the American Association of University Professors on "Women in Top level Teaching and Research". The survey based on the faculty members in ten leading high endowment and ten high enrollment .universities , showed that women make up about 10% of the assistant and associate professors, but only

5% of the full professors. Actually in the physical, biological and social sciences only 1% of professors are women.

I asked and obtained similar statistic data from the most prestigious United States Universities such as Harvard, Stanford, Berkeley, M.I.T. and Yale, and it is quite distressing to see that the situation in fact in these 9 years has remained practically unchanged.

With the wisdom which reflects the philosophy of her country of origin -Dr. Wu was born in Shangai in 1913 and came to the States in 1942 - the scientist ends her report in a mildly optimistic vein. " The underutilization of women... is thus severe. However there seems to be a glimmer of hope on the horizon. Women are currently making substantial contributions at the lower ranks in virtually all fields. There is a good chance that these women are today providing a solid base for the greater and surely necessary use of women at the highest levels tomorrow".

I am sorry to say that I do not share this optimism. The structure of human society does not as a rule - change for better or worse in a step like fashion, but only when they are overthrown by cataclysms which all of a sudden break down barriers which were supposed to be unbreakable (not only barriers raised by the law but also less tangible and far more powerful barriers rooted in the tradition) and sweep away, as a river in flood the peace ful rhythm of human life.

The Women's Liberation Movement viewed in this light appears to the observer as a true revolution. It started in the United States and from there it spread to all other Countries and has now taken such a proportion and direction as to disconcert even the liberally minded persons of both sexes and to appear as repulsive to those who feel deeply attached to the century-old tradition of a patriarchally ruled society.

It is certainly not this the place to discuss the positive and negative features of this movement which calls forth such violent reactions loaded with emotional overtones in its supporters as well as in its opponents. I suppose it is needless to state that I belong to the first category.

What can be the effect of this movement on the activity of that still too small number of young women who have selected a career, considered to be a typical men's career such as that of engineer and scientist? I am afraid that the advantages that we can hope to obtain for women of the young generation who have made this choice, will be slim if the today scientists, satisfied with the concessions which will certainly be granted in the near future and will make available more academic positions for women, will loose interest in the situation still prevailing in other fields, first of all that of politics, which today as yesterday, and thousand years ago, has been the indisputed man's privilege and field of activity. Women - and among them also scientists - never showed too much interest in politics, sharing in the general belief that this field belongs to man. How much this prejudice is still widespread, I had occasion to verify, much to my regret, in discussing the problem with colleagues and women scientists who had gained international reputation. Many of them declared their total indifference and almost annoyance toward this movement, stating that they had never suffered from discrimination, and in any way they saw no relationship between political activity and their own scientific activity.

I do not share this viewpoint and I hope that many in the audience feel in the same way. Human activities should not be divided in closed compartments - unfortunately it happens- and the excitement and pleasure which are part of a scientific career should not obnubilate the sensibility to other problems nor absorb all energies of men and women which should be - at least in part - available for other causes.

The women's problems, as I see them, are not so much or at least not only to make use of the reservoir of intellectual energies untapped for centuries, as to give to women the full measure of their intellectual talent and dignity as human beings.

In the same way, the Negro's Liberation Movement -which shares so many aspects in common with Women's Liberation Movement - has not been conceived by its more enlightened leaders, such as Martin Luther King, as a rebellion to physical oppression, but rather as directed to give back to the colored man his human dignity. "If a man hasn't found something he will die for" said Martin Luther King, shortly before being assassinated, "he isn't fit to live".

Today the Women's' Liberation Movement does not certainly ask from its followers any act of heroism, and this quotation would be out of place, were it not for its profound significance which brings into focus the universality of human values which have neither color not sex.

If women will succeed in solving the problem of pursuing the scientific career of their choice, without at the same time loosing sight of ethical and social problems which are today most urgent and acute and encompass far more than the relationship between the two sexes, they will have accomplished a much more important task than if they will concentrate all their efforts in gaining recognition in scientific fields.

Women's sensibility to social injustices - as proved by their heroic and relentless fight against slavery in the past centuries - while being of no use in understanding and solving mathematical equations, is instead of tremendous value in the field of human relations. In this area women - more compassionate and understanding than men - can play a leading role without neglecting other scientific and biological assignements, tha~ they should face in association and not in bitter fight with the other sex, no matter how profoundly justified is their resentment.

In closing in this conciliatory vein, I should however not like to convey the wrong impression that I do believe that differences can be met and injustices repaired by acceptance from the party used to accept.

A revolution needs not to resort to violence, but indignation, one of the most powerful and effective forces which move humun actions, as proveq by the tremendous impact that it played in exposing the infamy of slavery, is well appropriate in this early stage of the Women's Liberation Movement. Tomorrow, when women will have regained faith in themselves, and men will have recognized the advantage of their changed role, both will be able to work together in full harmony, to the great benefit of mankind, which - as all of you know, but as one is tempted all too often to forget - consists of men as well of women.

AUGURAL SPEECH

by Dr. Ing. Giovanni Nasi
Vicepresident of FIAT

I am very pleased to welcome the participants of this interesting meeting, and to greet them warmly on behalf of FIAT.

It is generally felt that computers, automation of plant, industrial production system development and inspection, and power sources have absolutely nothing to do with women.

Well, three hundred Women Engineers and Scientists from 34 countries gathered this week in Turin, are proving us that this feeling is a mere prejudice. It is, indeed, true that they are still a minority, in comparison with the male cohorts who are at present gathering in innumerable congresses all over the world. But it is a far cry from the time - as Miss Amour (an engineer herself) remembers - when she was "the only woman among more than a hundred young men attending the Polytechnic of Turin" facing all the professional problems arising for an "unwary" woman to become an engineer.

The great interest of this meeting lies not only in the scientific and technical value of the papers presented, but also its significance in a social framework - providing evidence of how women can reconcile their family role with their professional duties- and meanwhile how they can perform the tasks they are more fitted for.

"She looks so gentle, kind, and honest …" This verse by Dante lies at the origin of a peculiar concept about women, who, despite the course of time, cannot evolve completely because of the many obstacles in their way.

It is an angelic, ivory-tower concept of woman which led to a kind of social conditioning and intellectual mutilation.

In my opinion, one far from minor task of this Conference is to promote the proper evaluation of women in the work world, doing justice to their dignity and to the professional role they play which has, indeed, become essential to society.

Upon this acknowledgement, one can only hope and work for the reparation of the wrongs that men, through a combination of many circumstances, have perpetrated on society.

WOMEN ENGINEERS AND SCIENTISTS FOR HUMAN PROGRESS

Address by On. Dr. Vincenzo Russo
Under-Secretary of the Ministry of Public Works, Italy.

With great pleasure I am attending this important Conference to bring you the heartiest expression of esteem from the Italian Government, and the Department of Public Works, and to present my deep appreciation to AIDIA who has organised this Third International Conference of Women Engineers and Scientists.

I want also to extend my appreciation to the qualified representatives of women engineers and scientists for their professional activity and for their contribution to the technical and economic progress of our society.

The technological spur characteristic of our time has deeply influenced our way of living, overthrowing old structures and creating a new economic and social order. On this exciting renewal process depend the living conditions of future generations; the leader is mankind who accepts the challenge of progress towards higher achievements; leaders are too all those who contribute to the growth of society with creative enthousiasm, be it in the fields of science and technique as in any working field; leaders are yourselves, standing in the centre of the mechanism of technical progress, side by side with your male colleagues, and sharing with them their functions and responsibilities.

Your presence on this stage is rather recent but nevertheless your influence on new social developments is not less important. You have broken through a centuries old diaphragm bringing ahead to the more qualified expressions the process of women emancipation which accounts some prestigious and exceptional figures as Madame Curie, a process which only in our times becomes a general event.

Side by side with men you share with them the responsibilities of the scientific and technical advancement and, I may add, thanks to your peculiar sensitiveness you can give an original and effective contribution to the composition of some antinomies typical of our society and to the specification of the mainlines of development, consistent with the true human requirements. In fact, while women emancipate and hold new professional responsibilities, they still keep a close bond with their family, the cell of civil society which requires protection to be saved from the desacrating changes of the present time.

Family bond means constant and incorruptible connection with the intimate essence of mankind and with the inalienable values, often neglected by the pressing development of progress; it means the safeguard of civil growth from smothering prevalence of productive escalation and from persistent stimuli to consumption and moreover it means a guarantee to a balanced exaltation of spiritual and material components of the human being.

* * *

Environmental protection from irreparable contamination is actually one of the greatest tasks of our generation. To this purpose the contribution of your sensitiveness, balance and moderation is fundamental to reach a settlement among opposite requirements, as you are accustomed to do in finding the way of conciliating family and professional duties

Pollution problems do not only originate in a deliberate impoverishment of the soil for speculation; in this case it is hard to fight adverse interests, but the policy to be followed is univocal as absolute is the decision to avoid misuse and to protect the common good.

Other serious problems are due to the action of safeguarding the soil from the exercise of industrial activities that may impair the environment.It is a matter of location and of pollution. The difficulty in finding the solutions lies in the fact that the industrial activity cannot be stopped, while the environment cannot be slighted to further industrial development.

As I said at the Engineers Congress in 1969, the solution stands in finding the "relative maxima", that is to say in the respect on one side of social and human needs and on the other of economical requirements, without giving in on basic principles.

You are also charged with these responsibilities, while we hope that your contribution will help to a better exploitation of the territory potential riches, considered as location of productive activities and of human settlements, and as a common patrimony of human species, which must be preserved beyond our time.

I repeat here this appeal addressing you as women, besides as engineers and scientists, and trust that you will be able to help us in overcoming this serious trial as you help us to solve many difficult problems of family life.

This is evidently but one of the many tasks with which engineers and scientists, and yourselves too, are entrusted. More than in past times, engineers have extended their participation in those fields where their presence has acquired growing importance, not only on a technical and organisational level, but also on the decisional one.

Science and technology offer today tremendous possibilities which have to be mastered to reach the economical, social and human objectives of the civilization level of a nation and a higher standard of living.

The engineer today is not just a technician, he is a part of the managerial class endowed with decisional tasks ever more influential in respect to the progress of society. His professional figure is enriched with power, society relies on his ability more than in the past and entrusts him with heavier responiibilities.

It is therefore right to worry about some of his problems and to try to get for them satisfying solutions. These problems interest you too, who in addition have to c1aim the legitimate and indisputable right to carry on in absolute equality, formally and substantially with your male colleagues, the activity of your choice.

On the problems of engineers I want to say that the recognition of the heavy responsibilities with which they are charged does not have to become a sort of “heinous privilege” in respect to other professional categories, that is to say an "objective responsibility" without discrimination between unfor seeable risks and penal risks and without a thorough evaluation of actual responsibilities.

I want moreover to emphasize the exigency of a rigorous protection of the "engineer" title, both in the interior, in respect to other technical professions, and especially on the international and communitarian level to guarantee the freedom of circulation in the MEC countries.

* * *

But I would do you wrong thinking that these are your only problems. I have already mentioned the problem of equality with your male colleagues which has to be complete and absolute, at least to the extent that the feminine condition, which constitutes indeed your "gracious privilege", does not interfere - with the actual exercice of some professional activities. But your action and functions are not exhausted within these limits.

There is a problem of participation in the fundamental choices of the society, a problem of satisfying political demand which extends beyond the specific professional and economical questions to enter the motivations of your organisational efforts. I undoubtedly appreciate very much that the engagement of your Association is extended to the various problems of women's world, which need manifold solutions. And you represent indeed a qualified part of women's world, a vanguard in the general process of woman emancipation movement, one of the more overwhelming and unarrestable phenomena of our time.

This emancipation has to be intended not only as the attainment of a formal parity, but as a concrete presence of women in the various professional fields and as a qualifying contribution to the growing process of our society.

At the moment woman at man's side becomes the protagonist of technical, economic and social progress, all possibilities offered to men have to be opened to her legitimate requests, both in the vertical sense, as to reach top levels, and in the horizontal sense, as steady insertion opportunities in all professional and working levels.

A long way has been covered pursuing emancipation and this acknowledgement is dutiful towards all those who fighted for this purpose, not only belonging to the "fair sex", but men also, conscious of how important a full participation of women is in the progress of society.

Women have entered into a variety of professional fields and extended their working qualifications. Even if the rate of women employees is inferior to that of other industrial countries, it can't be denied that, with reference to our old traditions and to the age-long isolation of women in patriarchal families, many paces ahead have been accomplished.

Statistical data about women's employment in Italy which show an accentuation of the decreasing occupation rate are indices of a phenomenon to be watched and correlated to the basic changes of economic and social structures of our country transformation from agriculture to industry.

In an agricultural society women are steadily inserted in productive life; the family is an economic unity, a model cell of society. In a society where a rather rapid and large population exodus has occurred, woman has lost her preceding situation without a full substitution in the industrial and commercial fields, which have prevailed over the agricultural one.

That is why statistical data show a decrease in the employment rate of women, but this does not mean that the emancipation process is regressing, as it cannot be asserted that women's agricultural work in the patriarchal family was a proof of emancipation.

Census data clearly demonstrate this fact: in 1861 working women were as much as 49% of all women while in 1961 the percentage had decreased to 20% and in the last decade it has further lessened. However relevant, the increase of women occupation in industrial and commercial fields is not such to compensate the decrease of women agricultural occupation.

Among other causes contributing to the decrease of women occupation rate are the diminishing demand of non-qualified labor because of technological advancement, of the competition from unemployed manpower, the extended period of girls school attendance and the greater difficulties for women to find a working place at a mature age.

It is however certain that women's presence in the more qualified fields of productive and social activity has remarkably increased, while patriarchal families, whose women are lastingly engaged in rural field work, are disappearing. And it is also evident that modern ways of women's participation in social life are a strong expression of her emancipation, even if the rate of employment has decreased.

Problems have multiplied and sometimes reached a tragic stage. Modern working conditions in productive fields, in absolute parity with men, were dictatad by logic criteria and rhythm quite different from those pertaining to agriculture; and the influence on working conditions was greater not only in regard to the woman herself but above all with respect to the family.

Women's condition has hindered the trend toward complete emancipation on work as far as they have been charged with the difficulties of family man agement.

Many problems will undoubtedly be solved in a near future: technical and cultural progress will foster women's participation at more qualified professional levels and yourselves here are a proof of the long way covered on this direction. The extended period of girls school attendance will successively drive them to a more complete participation in productive activities; the improving of environmental and working conditions will easen out the ways of arranging working duties and family care, and the benefits of school education will favour women's contribution in commercial and social services.

The attainment of these goals requires yet a better integration between professional and family needs, which are still strongly conditioning the Possibility of reaching a full emancipation, without unadmissible renouncements.

Family problems don't have to burden women only, if we don't want to return to the archaic family, they have to be charged to the whole society. Society must secure facilities needed not only to guarantee women more working possibilities but above all for a more balanced civil society. In a situation characterized by prevailing industrial activity and as a consequence by increaseing urbanisation, the lack of social facilities prevents the compensation of the negative influence due to modern ways of living on family unity and on children's education.

The improvement of working conditions and of complementary services - as public transports - and the reduction of working hours are not only advantageous to women's occupation but represent a general improvement for all workers. Moreover, the development of services and facilities connected with the field of education, where married women represent 50% of employed women, in comparison with 30% in industry, constitutes also an important implement of social promotion.

The solution of this problem requires a unitary planning, considering the human condition as a whole, and society as a unit formed by different components aiming at the same objectives of civil and social development.

In women emancipation process it seems to me that no reason can be found to justify a direct opposition between men and women within social groups; conflicts do not derive from sex, but from the essence of problems which hinders the social development and equally affects women and men.

Therefore I believe that the alternative indicated on the Conference program:"Equal opportunity: deserved or gift ?", fails to acknowledge this fundamental aspect of social progress. Women's evolution, conditioning the proper family order is neither a ” right ” nor a "concession". It is the achievement of a true liberation from the repressive components of working and family life; achievement which presupposes efficient social services to lessen the heavy burden laid on women.

“ By itself the work is not a release “ said Ferrarotti asserting that in present conditions "woman's work cannot but exasperate the contradictions of our society. In the changing italian situation, women directly reflect the contrasting roles, expectations and interests which characterize the whole society and which cannot be solved without involving society in its complexity. Women's problem is the problem of the italian society, not on the statistical viewpoint but with respect to the conditions which will allow a creative activity as a possibility of self expression".

This definitely means that women's emancipation does not have to get through the opposition due to men's resistance to their efforts.

Men on the contrary are glad that women divide with them in the family as on the work rights, duties and responsibilities in a constructive reciprocity. This needs the consciousness that duties correspond to rights, responsibility to competence and hard working efforts to functions; this consciousness is being acquired by workers at any level and category, sex or job, but it has constantly to be recalled to avoid illusions and to get real achievements.

On this basis a joint action will be possible, to improve the society, utilising all energies and avoiding conflicts and divisions within the social groups engaged. The achievements will be the result of men and women common search for a civil emancipation of individuals, of organised groups and of the entire society. The emancipation cannot be pursued creating barriers that could delay or compromise the general process.

We all together, women and men, individuals and groups, shall define the prospects of a new world in which future possibilities will constantly overcome static equilibrium and acquired positions.

We do not fear the prophecy of Catone il Censore: "if you want women leadership, put them in equal conditions with men". We believe on the contrary that only if men are willing to recognize a position of parity for women, not a subordinate one, family condition, civil society and human progress will improve.

But let us warn women against being dragged away into extreme movements which can often lead to a fierce feminism: woman emancipation shall not pass through the century old conflicts with man, but has to be founded on a different relationship with man and on a common action aiming at the progress of the human society.

CONFERENCE FINAL RESOLUTION

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The Third International Conference of Women Engineers and Scientists, held in Turin, has developed two themes.

A technical theme, "**PLANNING FOR PROGRESS**" in six sessions

covering: Energy Sources,
Communication and Transportation,
Computers Technology,
Housing,Town and Community Planning,
Industrial Production,
Human Engineering,

and a sociological theme " **WOMEN'S PROFESSIONAL AND FAMILY DUTIES** "
in four sessions convering: Problems of Aptitudes or of Traditions?
How to integrate Alternatives,
Evolution of Women's Role,
Equal Opportunity: deserved or gift?

Apart from any particular problem of their specialized field of activity, women engineers and scientists from 32 countries of the world agree that the quality of human life can be enhanced only be the responsible use of scientific and technological achievements, and that they will dedicate their efforts to this purpose, both in professional and in family life.

Turin, September 10, 1971

The Conference Secretary

Anna E. Amour

FORMAL RESOLUTION

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The Third International Conference of Women Engineers and Science tists was attended by women from 32 countries, all members of the United Nations.

The technical theme of the Conference **"PLANNING FOR PROGRESS"** was based on the concept that planning requires a choice among the new ways and means attained by scientific and technological advancements to achieve real human progress.

The Conference took particular note of the concern of the members of the United Nations in the present state and future fate of the human environment, and appreciated especially the practical approach to the problem demonstrated by the setting-up of a special Secretariat to organize world consultation in Stockholm in 1972.

Believing in the need for a world approach to human environmental problems, the Third International Conference of Women Engineers and Scientists:

a) associates itself with the aims and aspirations of the 1972 Stockholm Conference on the Human Environment;
b) communicates its support to the Secretary-General;
c) places at the disposal of the Secretariat the technological expertise of its members, who are engineers and scientists from 32 members states.
d) extends to the Secretary-General its good wishes for the success of the Stockholm Conference.

Turin, September 10, 1971

The Conference Secretary
Anna E. Amour

MINUTES OF THE INTERNATIONAL MEETING OF REPRESENTATIVES
22.00 hours, Wednesday 8 September 1971

Present

The Conference Secretary: Anna E.Amour
Chairman: Isabel Hardwich

Representatives

Argentina	Tania P.de Cano (Centro Arg.de Ingenieros)	Switzerland	Erna Hamburger (IFUW)
		Tanzania	Mrgaret Kiame
Austria	Meta Schummer	Turkey	Bilge Ozguner
	Sophia Machado Portella (Ass. Eng. Arquit.do Brasil)	Uganda	Miriam Sebaggala
		U.K.	Peggy Hodges (W.E.S.)
Colombia	Blanca Molina de Kocsis	U.S.A.	Carolyn Phillips (S.W.E.)
France	Sylvie Hoppilliard (A.E.P.F)	U.S.S.R.	Suria Tatevian (Soviet Women's Committee)
Germany	Rosemarie Berger (V.D.I.)		
Holland	R.E.W.Kropveld	Observers	
India	Ila Ghose (Inst.of Engineers)	Argentina	Sonia Bevilacqua (Centro Arg de Ingen)
Italy	Lidia Lanzi (AIDIA)		
Japan	Dorothy Mizoguchi (Soc.of Japanese Women Scient.)	France	Giséle Hugues (Cerecle d'Etudes des Ingénieurs)
Malaysia	K.H Ong	Mexico	Isabel Cisneros de Aguirre
Mexico	Estefania Chavez de Ortega (Asoc.de Univers.Mexicanas)		Susana Gody Castrillon
			Valeria Prieto
Nigeria	Ebun Oni		Edith Nunez Tovar
Poland	Maria Grabczewska (PZITS)	U.K	John Hardwich
Portugal	Anterna Valeriana de Seabra (Ordem dos Engenheiros)		Beatrice Hicks
		U.S.A	Lydia Pickup

Preamble

Dr.Amour opened the meeting and introduced Dr. Luigi Richieri, who on behalf of the Order of Engineers of the Province of Turin courteously welcomed delegates in the seat of the Order and expressed the best wishes of success.

Dr Amour called on Mrs.Hardwich, Chairman of the International Committee set up at the end of the Second Conference, who took the chair.

Telegrams and messages of greetings were read out.

Prof.Hamburger presented the greetings of the IFUN , announced its new board and the hope that many countries will have a group of women engineers to deal with technical matters.

Future Conferences

It was unanimously agreed that the International Conferences of Women Engineers and Scientists must continue. Four offers to organise a future Conference were received.

a) The President and the Secretary General of the Polish Association of Building Engineers and Technicians, PZITB, informed of their readiness to organize in Poland the Fourth International Conference.
b) The President of the Institution of Engineers (India) offered to extend

every assistance and cooperation for a Conference to be held in India in a near future.
c) Mrs. Ozguner offered to organize the Fourth Conference in Turkey.
d) The delegates from Mexico offered to organize the Fifth Conference in Mexico with the assurance that they had the backing of the local Engineering Institutions.

Gratitude was expressed for all the offers and much discussion ensued.

Fourth Conference

On the majority vote in a paper ballot allowing one vote per country, the invitation to hold the next Conference in Poland was accepted. The preferred date was 1975, in order not to clash with the meeting of the International Federation of University Women in 1974 in Tokyo.

Mrs. Grabczewska expressed her pleasure at the decision and said that the PZITB would be delighted to welcome delegates to Warsaw in 1975.

Invitation from Japan

Miss Mizoguchi regretted that the Society of Japanese Women Scientists was unable to organize the Fourth Conference, but extended a warm welcome to all who will attend the IFUW 1974 Conference to join with her Society for a meeting.

Organisation of future Conferences

The content and organisation of technological sessions gave rise to an animate discussion; different opinions were expressed, some of them are following.

Dr.Oni supported Prof.Jackson plea for the provision of working groups at the next Conference, suggested to have smaller sessions to discuss in greater details specialized subjects and asked to set up a Committee to prepare a workable Format for the planning of future sessional meetings.

Dr.Amour said that the acceptance of almost all the papers offered was a deliberate choice aiming to make the Conference a demonstration of women engineers and scientists talent and capacity to play an active role for human progress.

Mrs. Prieto appreciated the great number of papers as an opportunity of coming to know how other countries resolve other problems.

Lydia Pickup added that some companies would not let their employees come, if the theme of the Conference were not of general interest.

Dr.Hicks proposed to read the summaries of the papers in general sessions then to discuss them in separate sessions for working groups to develop individual subjects.

Dr.Kropveld would have preferred 10% of the time allowed to the presentation of papers (not too specialized) and 90 % to discussions.

Mrs. Hardwich remarked that the three Conferences were quite different the one from the other and suggested that an attempt should be made to report back the results of the discussions, so that some definite conclusions could be drawn from the Conference.

Expressions of thanks_to organizers of Third confernce

The meeting concluded at 23.00 hours with a hearty vote of thanks to Dr. Amour and AIDIA for their good work in organising the Third Conference.

LIST OF PARTICIPANTS BY COUNTRY

ALGERIA

VERONESE Miss Lidia

ARGENTINA

DE CANO Mrs.Tania P.
BEVILACQUA Miss Sonia

AUSTRIA

SCHUMMER Mrs. Meta

BELGIUM

TSTANG WEI Mrs. Amy Hua

BRASIL

AMARAL Mr. Rubem Dario
AMARAL SOUZA LIMA Mrs.E.
MACHADO PORTELLA Mrs.G.
MACHADO PORTELLA Mrs. S.
MEDEIROS Miss Heloisa
PACHECHO Miss Isa
SOUTO LYRA DE FREITAS Mrs. Marina

CANADA

BERBYNUK Mrs. Stella
DORMER ELLIS Miss M.E.

COLOMBIA

MOLINA DE KOCSIS Mrs.Blanca

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CONTESSO M.me Lydwine E.
GUILLERAULT-DANEL M.me
GUILLERAULT-DANEL
HOPPILLIARD M.me Sylvie
HUGUES M.me Gisé le
LEBON Mrs. Genevié ve
MABILLEAU M.lle Thé ré se
PLINATE M.lle Jeannine
ROCHAS M.me Marcelle

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GETGER Miss Monika
KNOTT-TER MEER Mrs. ILse
KUNNETH Mrs. Hi ldegard G.
MUSSO Mrs. Renate
SCENEIDER -BURGER Mrs. Martha
SCHNEIDER-BURGER Mr.Max

GREECE

GARYDIS Dr. Euphrosini KOUNDOURI Mrs.Sophia

GHANA

OBENG Dr Letitia

INDIA

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MUKHERJEE Mrs. Tuhina

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MONADJEMI Miss Badri P.
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CAFFARO RORE Miss Giulia
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CASIELLO DE MARTINO Mrs.S.
CAUVIN Mrs.
CERRI BUTERA Mrs. Maria G.
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FERRARI TONIOLO Mr. Andrea
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FERRARIS Mr. Arrigo
FERRARIS ZETTO Mrs. Liana
FLEMATTI Miss Delia
FLEMATTI Miss Pina
FORCHINQ Miss Cleofe
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IVALDI Miss Maria Lucia
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RENOGLIO CAVANNA Mrs.Rosa
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MALAYSIA

ONG Miss K.H.
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GODOY CASTRILLON Mrs.Susana
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DEN TONKELAAR Miss E.M.
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GRABCZEWSKA Mrs. Maria
KOTELA Mrs. Irene
KUNINSKA -ZACHWATOWICZ Mrs.I.

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VALERIANA DE SEABRA Mrs.A.

RUMENIA
ELIAT Mr. Nicolai
ELIAT MUSATESCU Mrs.Andr.

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HAMBURGER Miss Erna
JUILLARD Mrs. Jacqueline
KIND-SCHAAD Mrs Gritli
RAHM Miss Berta

TANZANIA
KIAME Miss Margaret

THAILAND
SAENGBANGPLA Mrs.Phulporn

TURKEY
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OZGUNER Mrs. Bilge
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BUSSELL Miss Hettie L.
BUTLER Mrs. Jo
BUTLER Miss Lee
FERGUSON Mrs. Margaret
FERGUSON Miss Sallie
HANSFORD Miss Elsie F.
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HARDWICH Mrs. Isabel H.
HARDWICH Mr. John N.
HODGES Miss Peggy L.
HOWARD Cdr.John A.
HOWSON Miss Jane
INGLIS Miss Sheena
JACKSON Miss Daphne
LAVERICK Mrs. Betty
McMINN Miss Barbara
MACPHERSON Miss Margaret
MAPLE Mrs. May
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REEVES Mr. Cyril G.
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THOMPSON Miss J.Cicely
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VENTRIS Mrs.Lois
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POULTNEY Miss Georgine M.
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ROUPE Mrs. Pamela A.
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RUSSELL Miss Mary Ellen
RYAN Mrs.Irene E.
SALEMBIER Mrs. Olive
SLOAN Mrs.Martha E.
STEEL Miss Mary Nan
STONE Mrs.Renée R.
THOMAS Miss Carole
THOMAS Miss Eva
THOMPSON Capt. Rose Mary
THOMS Miss Meredith
WALKER Mrs. Ruth A.
WARNER BROWN Mrs.Alice
WHITE Mr. Herbert A.
WHITE Mrs.Winifred D.

U.S.S.R.
DATSENKO Miss Albina
SHITSKOVA Mrs.Anastasia P.
TATEVIAN Miss Suriya

LIST OF PARTICIPANTS

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R. Representative of

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PLANNING FOR PROGRESS

Volume II

CONTENTS.

****

****

Technical Session A.

ENERGY SOURCES

****

In the Chair: Cicely **THOMPSON**, U.K.

****

1. **L. CHEBATAROFF** (Uruguay) , Développement hydroélectrique du Rio de la Plata.

4. **D.M. Mc NULTY** (U.S.A.), Automation of nuclear power plants.

5. **A.M. MONCASSOLI TOSI** (Italy), Uranium depletion, plutonium production and energy generation in a thermal nuclear power plant

6. **M. SAKUNTALA** (India), **MHD** power generation.

7. **A.E.AMOUR** (Italy), Solar energy for water desalination.

8. **L.BOLDRINI CONTI** (Italy), New power generation systems.

10. **M.TANAKA** (Japan), Carbohydrate, physical properties and their measurement.

12. **N.BECARUD** (France), La lutte contre la pollution des eaux en France.

13. **L.E.OBENG** (Ghana), A plea against polluting the unpolluted countries.

14. **K. CHANDRASEKHAR** (India), The hazards of water pollution to developing edible fisheries and remedial suggestions

****

Technical Session B.

COMMUNICATION AND TRANSPORTATION

****

In the Chair: Ila GHOSE, India

****

1. **E. HAMBURGER** (Switzerland), Un example de normalisation de terminologie scientifique et technique
2. **M. OWEN** (U.S.A.), A plea for greater readability
3. **E. ONI** (Nigeria), The problems of directing scientific research towards the industrial needs of developing countries
4. **M.de GOODING** (Venezuela),Evolution of telephone services in Venezula
5. **M. VADNJAL** (Italy), Satellite communications
6. **S. TATEVIAN** (U.S.S.R.), Satellite and geodesy
7. **SALEMBIER** (U.S.A.), Containerization -The modern concept of transportation and distribution
8. **M. MAPLE** (U.K.), Transportation of heavy indivisible loads
9. **H. BUSSELL** (U.K.),The Channel Tunnel and its effect on rail traffic in western Europe
11. **A. ARJANGI** (Iran),Pipeline systems for crude oil, products and natural gas in Iran
12. **I. RYAN** (U.S.A.), The proposed Trans-Alaska pipeline background on the largest private construction project in the world
13. **E. LAVERICK** (U.K.), Airport instrumentation and its influence on air transport of the future
14. **J. PLINATE** (France), L'aérotrain : transport moderne de l'avenir
15. **C. SCHOFIELD** (U.K.), The Concorde supersonic transport aircraft

Errata - Corrige

****

Technical Session C.

COMPUTERS TECHNOLOGY

****

In the Chair: Marion SCATCHERD, U.K.

****

1. **M. SCATCHERD** (U.S.A.), Information handling for and by engineer

2. **L. VENTRIS** (U.K.), Semiology and symbiosis.

3. **M. FOX** (U.S.A.), Computer based information services on the computer and information sciences

4. **G. HAYS** (U.S.A.), Computer aided design and manufacturing: eliminating engineer's routine tasks

6. **P. HODGES** (U.K.), Some application of computers to engineering

7. **S. INGLIS** (U.K)., The use of computers in production control

8. **L.A. BRYANT** (U.S.A.), Microcomputer control of radio communication systems

9. **H. MEDEIROS** (Brasil), Highway research information services for developing countries

10. **G. HUGUES** (France), L'informatique au service de la production industrielle dans Ie domaine de l'optique

12. **G. MURRAY HOPPER** (U.S.A.), Progress - Challenge to computers

****

Technical Session D.

HOUSING, TOWN AND COMMUNITY PLANNING

****

In the Chair: Laura LANGE, Italy.

****

1. **E.CHAVEZ de ORTEGA** (Mexico), Dwelling: image of our social progress

3. **I.KUNINSKA-ZACHWATOWICZ** (Poland), The problem of housing in the aspect of the modern family structure and the technical progress

4. **Elsie EAVES** (U.S.A.), Housing headaches in the U.S.A.

5. **P.G.BURNHAM** (U.S.A.), Required factors for the success of a nationwide factory produced housing industry

6. **E.JACOBSON ROGERS** (U.S.A.), Health, education and welfare: constructive construction for people

7. **S.GODOY CASTRILLON** (Mexico), Une solution possible au problème des taudis aggravés par la loi sur Ie blocage des loyers

9. **Hande SUHER** (Turkey), Housing and resettlement problems in Turkey

10. **L. ZETTO FERRARIS** (Italy), Designing and planning with three dimensional models

11. **M.E.RUSSELL** (U.S.A.), Geophysics the basis for environmental control in community planning

12. **J .L.HAMILTON** (U.S.A.), The need for hydrogeologic studies in urban planning in semi-arid areas

13. **S.CASIELLO DE MARTINO** (Italy), Town planning of ancient centres

15. **Wajeda J.RAB** (East Pakistan), Open space system study for the Dacca me tropolitan area

16. **Ayten CETINER** (Turkey), Urban renewal in Turkey

17. **Irene KOTELA** (Poland), Perspectives du développement des services dans les unités d'habitation au centre de la ville à la base de la structure de la ville de Varsovie

Errata - Corrige

****

Technical Session E.

INDUSTRIAL PRODUCTION

****

In the Chair: Lydwine E. CONTESSO, France.

****

1. **M.VANNINI SCAGLIOTTI** (Italy), Digital instrumentation
2. **C.E.ARREGGER** (U.K.), Limits of measurement accuracy in industry
3. **M.F.McFADDEN** (U.S.A.), The role of materials, finishes and processes in industry in the 70
4. **V.MILLIGAN** (U.K.) Improving efficiency in the construction industry
5. **M.PRITCHARD** (U.S.A.), Periodic review engineering, an audit function of industrial engineering
6. **B. BARTAKOVA** (CSSR), Industrialisation and electrification of tropical regions as a necessary precondition for living
7. **K.H.ONG** (Malaysia), Standardisation as a rationale in production

****

Technical Session F.

HUMAN ENGINEERING

****

In the Chair: **Dorothy MIZOGUCHI**, Japan.

****

1. **Lydia I. PICKUP**(U.S.A.), Safety: an engineer's responsibility
2. **Carolyn PHILLIPS** (U.S.A.), Industrial hygiene – the total work environment
3. **C.BORDONE SACERDOTE** (Italy) , Noise: a problem of comfort and health
4. **Martha E.SLOAN** (U.S.A.), Population modeling for the engineer
5. **Martha E.MUNZER** (U.S.A.), A durable environment: ecology: and the engineer.
6 .**Anastasia P.SHITSKOVA** (.U. S. S. R.), Hygiene of woman's labor and the progress of science and technology

****

WOMEN'S PROFESSIONAL

AND FAMILY DUTIES

Volume III

CONTENTS

****

****

Sociological Session A.

PROBLEMS OF APTITUDES OR OF TRADITIONS?

****

In the Chair: **Lydia PICKUP**, U.S.A.

****

1.**M.BRYLINSKI** (France) , L' insertion des femmes ingénteurs dans la vie professionnelle en France

2. **D.JACKSON** (U.K.), Educational developments in science and engineering and their influence on opportunities for women

3. **MANGERIO, KRUMINS, ROUPE & BLENX** (U.S.A.) University students attract high school students into engineering

4. **L.MURAD BABLANIAN** (U.S.A.) Contemporary education of women

5. **B.OZGUNER** (Turkey) Women of Turkey today

6.**D.E.AJAKAIYE** (Nigeria) The role of women engineers and scientists in a developing nation like Nigeria

7. **V.PREININGEROVA** (CSSR) Problems due to ever increasing mass participation of women in science technic and production processes in the socialist countries

8. **M.DORMER ELLIS** (Canada) In Canada, must engineers be men?

****

Sociological Session B.

HOW TO INTEGRATE ALTERNATIVES

****

In the Chair: **Lydia PICKUP**, U.S.A.

****

l.**Rosemarie BERGER** (Germany), The problem of part-time workers in technical professions

3.**Mariadele MICHELINI CROCIONI** (Italy) , La maison et la structure urbaine pour la libération de la femme

****

Sociological Session C.

EVOLUTION OF WOMEN' S ROLE

****

In the Chair: Lidia DE RITA, Italy.

****

0. **L.GUILLERAULT-DANEL** (France), Le role de la femme ingénieur vu par 1' Open Door International

1. **E.HARRISON** (U.S.A.), Evolution of women's role in the U.S.A.

2. **K.P.SULEEBKA** (India), Women's role in Indian society

3. **A. VALERIANA de SEABRA** (Portugal),Quelques aspects des fenunes ingénieurs portugaises

4. **M.RAHMANI** (Iran), Evolution of Iranian women's role

5. **A. PEREZ LOPEZ** (Mexico) , Present and future of the Mexican woman

6. **M. GRABCZEWSKA** (Poland), Women engineers' role in solving the sociological problems of housing in Poland

7. **Z.A.YANKOVA** (U . S. S. R.), Social roles of a working woman

8. **P.SAENGBANGPLA** (Thailand) , The role and progress of Thai women engi neers

9. **S. PAGNOLETTI LANZA** (Italy), Evolution of women's role in Italy and in Europe

10. **V. PRIETO** (Mexico) , La participation de la *fenune* architecte au developpement de la communauté rurale

****

Sociological Session D.

EQUAL OPPORTUNITY: DESERVED OR GIFT?

****

In the Chair: Lidia **DE RITA**, Italy.

****

1. **Ruth SHAFER** (U.S.A.), Equal opportunity - A fact of life
2. **E.M. MURRAY LENTHALL** (U.S.A.), Women as a minority group – Comparison between the U.S. and the U.K.
3. Renée **R. STONE** (U.S.A.), U.S. Federal Government - Equal opportunity: facts and fiction
4. **Z. SZENTGYORGYI**(Hungary), Toward equal opportunities: Hungarian women engineers
5. **Renate MUSSO** (Germany), The career of women engineers and scientists in Germany
6. **Tania P.de CANO** (Argentina), The woman engineer in Argentina
7. **A.A. KAPOSI** (U.K.), Systems engineering - The field for women?
8. **Phil D. REEVES** (U.K.), Sixty years in motor engineering

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T A 7

SOLAR ENERGY FOR WATER DESALINATION

by Anna E.Amour

Biography

Anna E. Amour was conferred the Doctor's Degree in Electrical Engineering at the School of Engineering in Turin in 1933. In 1934 she joined The Società Idroelettrica Piemonte, where she was charged with the Study and Statistics Office of Gruppo SIP until 1951. On leave in 1952 she went to get a Master' s Degree in Industrial Engineering at New York University.From 1953 back in SIP, now Enel, she was charged with the Direction of a Technical Review for employees and with the Suggestions and Proposals Office. She has retired from Enel in 1970.

Summary

Ways and methods of solar energy utilisation by conversion in thermal, electric and mechanical energy are presented. The possibilities of utilising the solar boiler with anti-radiating cells are examined to the purpose of feeding with heat a water desalination plant, which could conveniently be put at work to meet water needs of seaside communities.

SOLAR ENERGY FOR WATER DESALINATION

by Anna E. Amour

Sun gives life to Earth with the energy irradiated by its process of thermonuclear fusion.

Solar energy ha s a wavelength variable from 0.17 to 4μ. with maximum intensity for a wavelegth of 0.47 μ in the visible spectrum (yellow-orange).At the boundaries of the atmosphere the solar energy has a constant intensity equivalent to 1.94 cal / min /sq.cm, that is of 1.35 kw/sq.m , but the atmosphere absorbs a part of it, so that the intensity of the solar radiation reaching the earth's surface can be on the average valued at 1kw/sq.m.

In one year, the energy received from the sun on earth sums up to 150,000 billions of equivalent tons of coal, that is to say as much as 25.,000 times the whole actual energy consumption, which is currently about 6,000 billions of equivalent tons of coal. Assuming that fossil fuel resources could satisfy human needs for at least 100 years, the same demand could be satisfied in a few sunny days by solar energy.

Solar energy utilisation

Since ancient times men had found some systems of utilising solar energy by means of mirror and of lenses. Already in 1615 Salomon de Caux used solar energy to pump water, but only from some decades the idea of utilizing solar energy on great scale has attracted the attention of scientists. Their studies have developed on one side on the theoretical understanding of phenomena connected with solar radiation and on the other side on the actual possibilities of application to human needs of this fantastic energetic disponibility.

In addition to the fact that fossil fuels ascertained resources will not be sufficient to cover the growing demand of energy for more than a few hundred years, it has to be pointed out that these resources could be utilised through chemical processes with far more valuable results than those obtained by burning and destroying them to produce electric and mechanic energy, polluting the atmosphere.

The biggest source of energy that humans have at their disposal is Sun. Sun's energy is clean, does not produce smog or contamination, is on the average constant in value and is freely distributed on earth.

To meet human requirements, it is however becessary to convert it in thermal energy of higher characteristics, or in electric or mechanical energy.

The recovery of salt from brines by solar evaporation of sea-water is a well-established economical process in wide use, which has a long and well documented history.

Direct conversion of solar energy in electric energy by photovoltaic cells is a mainstay of space power systems, where the primary requirements are low weight and a high degree of reliability. Several microwave relay stations and unattended navigational lighthouses are powered by these converters. The total generating capacity of all of these facilities, terrestrial and space, is probably less than 100 kW, but the annual investment in these devices is likely to be about 10 million dollars.

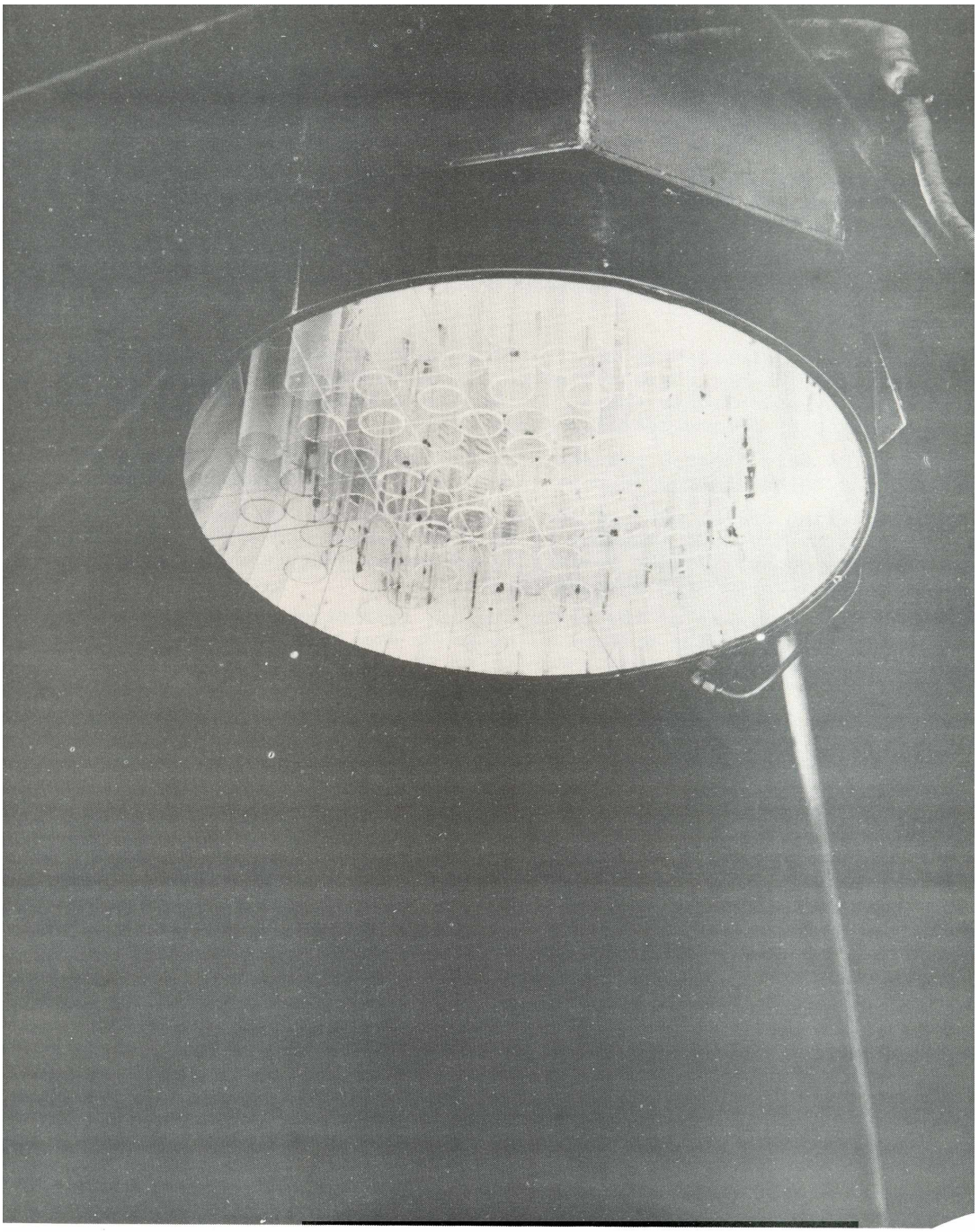

Fig. 1 - The solar boiler and its anti-radiating cells.

Solar energy conversion in thermal energy is actually achieved with good results in flat-plate collectors for water heating. New materials for transparent suffaces with high absorbing and low emitting power are used to collect and use the maximum possible part of radiated energy.

In fact the efficiency of a flat plate collector can reach 80% at a temperature of 30°C, but if the conversion temperature is increased, the efficiency diminishes because of heat losses.

Solar water heating for domestic purposes is a process now being used in at least a dozen countries by more than 10 million persons.

The solar boiler

An outstanding progress in the transformation of radiating energy into thermal energy of higher characteristics is due to the invention of anti-radiating cells by which solar energy can be concentrated at high temperatures,such as required by thermoelectric plants.

These cells were firstly presented at the International Conference of United Nations on New Energy Sources (Rome 1961) by Prof.Giovanni Francia.

Anti-radiating cells, made of common materials, such as glass, pyrex, quartz, plastics, etc. are transparent to solar energy and are black enough in the physical sense, for the re-irradiated energy. They are placed in honeycomb panels, as protection absorbers.

In fact, the surfaces of the cells are not cylindric, but rather truncated conic, so that half the opening of cones be small enough and the ratio height / dia large enough to avoid escaping of the rays before reaching the absorber.

When the honeycomb structure of anti-radiating cells is suspended above a mirror field, there will be no limitation to incoming radiated energy, while hot rays reflected inside the cells are absorbed by the cells walls and contribute to elevate its temperature. (Figure 1)

Without entering in other technical details, which can be found in the existing literature, it can be added that the anti-radiating cells are the furnace of the solar boilef, which can reach a temperature of over 1000 C.

The monotubolar boiler consists of 60 m of blackened steel tubes, wound up partially as a coil and partially as a spiral. The boiler is fed by a centrifugal pump having a large delivery at low pressures and by a piston pump for high pressures.

The first solar unit was built in S.Ilario with the support of CNR and NATO by the Mechanics Institute of the Faculty of Engineering, headed by Prof.A.Capocaccia, of the University of Genova.

The mirror field was composed of 121 round mirrors, arranged as a chessboard, 58 cm in diameter, for a total working surface of 30 sq.m, supported by a kinematic motion which transforms the uniform motion by 1 rev/day and is gradually adjusted by a centralized control.

The plant was put in operation in 1965; in the maximum sunlight hours 21 kg/hr of steam at 500°C were obtained and an average of 19kg / hr for periods of 5 - 6 hours.

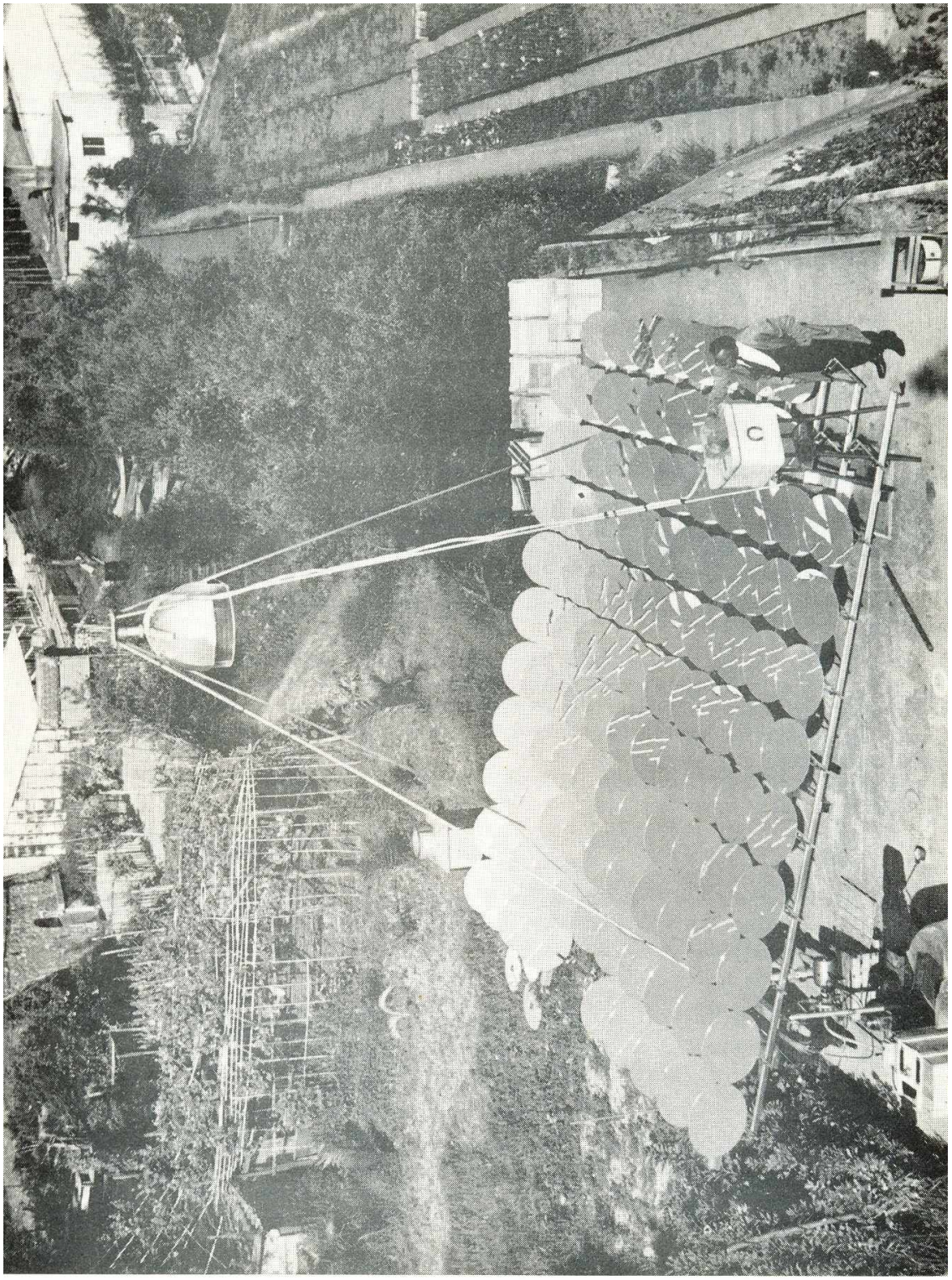

Figure 2. - The solar boiler suspended above the mirrors field of S. Ilario.

In this plant, because of the high surface temperatures, it was difficult to maintain the black colour of the heat exchanger tubes. A new boiler was built in which the absorption of solar rays was ensured by the optical properties of new materials of which the tubes were made.

In the third plant, the boiler is of the same type as as the former ones and consists of a monotubolar preheater assembled in a double conic helix leading to two cylindrical headers from which 200 vertical tubes emerge. These tubes are used for the evaporation phase. Evaporating tubes are led to a steam header which is also used as a condensate separator and placed on top of the boiler. From the header, steam goes to the superheater, consisting of a conic helix, drawn from a single mass of high resistance steel suitably divided, worked and assembled.

The boiler, of 1 m diameter about, is placed on top of a cone of half opening of 47 deg., to include the mirror field. (Figure 2)

The mirrors, made of plastic material covered with anodized aluminium, are 271, for a total working surface of 200 sq.m about. They are hexagon shaped and honeycomb mounted, to reduce the losses due to mirror's interference and to allow adjacent assembling of other mirrors without idle spaces. Each mirror is moved by a kinematic motion centrally controlled. The kinematic motions are arranged in such a way that the boiler can be seen as far as a minimum angle above the horizon of 43 degrees.

With this plant, 150 kg / hr of steam at 150 kg / sq.cm and 700°C can be produced.

The solar boiler of S.Ilario is an experimental prototype and will serve the purpose of getting more detailed informations and data, useful to determine the best characteristics for future construction on industrial scale and on economical terms, in the hypothesis that the steam produced will be used to feed a turbogenerator. In this case the solar station will be completed by a specially designed underground heat accumulator, to supply steam at the required conditions, even in the absence of sun.

It can be added that the solar plant has been authoritatively proposed as a booster to a thermic boiler, limited to act as an evaporator.

In the writer's opinion the characteristics of such a solar boiler could find other interesting applications , first of all for the desalination of seawater to produce fresh water.

Fresh-water needs

Water, as air, is indispensable to human life and human civilization has developed in the regions where the disponibility of water was abundant. But now, the explosion of world population and the accrued necessities of water for civil, agricultural and industrial uses are causing a general scarcity of water. Some data about water consumption can give evidence to the problem.

A person living in major cities needs 800 1 of water a day, about ten times as much as a hundred years ago ; air conditioning of an eight floor building requires 3 millions 1; the production of 1 ton of steel requires 250,0001 of water, of 1 ton of beef meat 31.5 millions 1, of 1 ton of cereals 450,00 1, etc.

Water desalination systems

Now, considering how much the human well-being is influenced by water disponibility, both in the cities and in rural areas, and the fact that the sun shines when it does not rain, or in other terms that the need of water increases during drought periods, and that water can be stored while sunshine has to be enjoyed when heaven allows it, it seems desirable to extend as possible the utilization of solar energy to get freshwater.

Actually, solar distillation of salt water for the production of potable water for human or stock consumption can be described as in the pilot-plant stage of development, with small comnunity scale plants now in operation or under construction in several countries.

Distillation devices used, as roof type solar stills, or hot boxes, tilted solar stills and stills with soaked surfaces, have a small capacity which can be sufficient and most appreciated in remote areas or for special applications. But in the countries like Italy, where a great part of the population lives at a distance of less than a few km apart from the border of the sea, in a mild climate where the sunny days are more numerous than the cloudy ones, it should be possible to take advantage of the solar boiler, putting it at work in larger distillation plants.

Apart from flat-plate solar collectors and other devices in which the sea water is directly heated by solar energy, other systems have been successfully put in operation in which the water to be evaporated is heated by an external source of thermal energy: conventional fuels, nuclear energy or low pressure steam recovered from other industrial processes.

One of these is the evaporator with submerged tubes, where the steam circu1ates and releases heat to saline water which evaporates. The process re-quires large surfaces for heat transmission at a given difference of temperature and implies high investments and the need to prevent or to remove scaling.

Another system is the evaporator with vertical tubes; the steam circulates around the tubes which contain the sea-water to be evaporated. The problem of scaling remains but the descaling is easened.

In the flash distillation system, the heating of sea-water and the evaporation if it, take place in two different rooms; there is no direct transmission of heat and the latent heat of vaporization is supplied by the internal energy of heated sea-water. There is no boiling of water at steady temperature, as in the two preceding systems, but the vapor is extracted at constant pressure, while the saline water cools as it evaporates.

The flash distillation tanks can be mounted in series, subdividing the whole process in several stages, each one of which is fed by the water coming from the preceding stage. Pressure and temperature decrease from one stage to the following. The extraction of distilled water requires a partial vacuum which increases from one stage to the other.

In this system, fluids at different temperatures circulate in counter current. One heat exchanger is sufficient to heat the saline water, which is preheated in its passage through the evaporation rooms.

The flash distillation system is already working in many desalination plants. Its advantages consist in the reduced extension of the surfaces subject to scaling and corrosion; it can be composed of several stages in a limited range of temperature and allows the recovery of heat losses at a relatively low level of temperature.

The imagined desalination plant

A system of flash distillation with forced circulation and vapor compression is schematically shown in figure 3.

Apart from the number of mirrors in the field, the capacity of the system can be increased and the risks of scaling reduced, separating the preheating of water from the evaporation zone.

The solar boiler of S.Ilario, equipped with a centrifugal pump could give 195 kg / hr of saturated steam at 50 kg / sq.cm and 262,7°C.

The theoric value of energy necessary to distillate 1 mc of water has be ascertained around 0.5 KWh / mc, that is 430 Cal / me, but this is a minimum inaccessible limit for a perfect plant working at 1 efficiency.

Actually, distillation plants in operation require 10 to 20 kWh /mc of freshwater produced. In the assumption that a flash distillation plant, as the one imagined, heated by a boiler of such special characteristics could work with no more than 10 kWh/mc, the production of fresh water could be around 15 mc/hr, that is in 6 sunny hours 90 mc/day and in 200 sunny days 18,000mc/year.

These assumptions are obviously intended but to give an order of magnitude of the technical feasibility of the plant, which is but one aspect of the project. The other,its economical convenience, should be examined on the basis of plant construction characteristics and their running costs. Being the plant of S.Ilario still at an experimental stage the estimates are difficult to be made with some exactitude.

While from the experimental data, until now collected there are good reasons to hope that its construction on a commercial scale would be feasible and convenient to take profit of the energy that the Sun generously diffuses every day on the world.

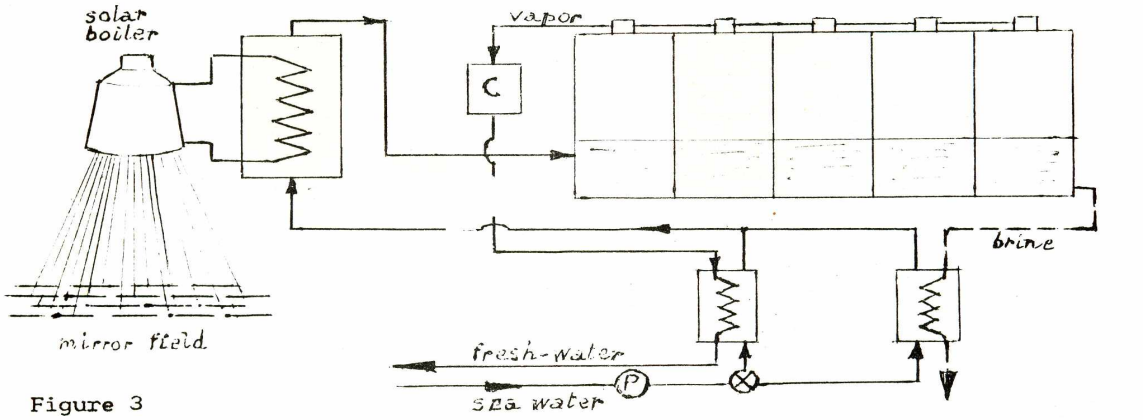

Figure 3

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 1964-1968 with 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 of 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 on 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.

A PLEA FOR GREATER READABILITY

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Research reports, operational procedures, even some popular science articles, 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, accuracy and usually be attained by conscientious attention to detail. Readability, however, depends almost entirely on ability to tailor the text so that it will be understood by a particular audience. The technically sophisticated reader will be bored by the same material that appears impossibly complex to the uninitiated.

Writing is an art, not a science. That "fact" does not relieve scientists from the necessity of writing, nor is it an excuse for bad writing. Scientists and engineers are educated, literate people, who do not have to be novelists to write clearly. Further, only the person intimate with the technical details of a subject can write about it with real accuracy and authority.

We respect technical papers for their informational content, even when we complain that they are difficult to read and difficult to write. Admittedly, much contemporary technical writing is riddled with verbosity, stilted language and obscure references. But there is also a growing volume of good technical writing, writing that is highly readable, accurate" and informative.

Many large engineering and research organizations employ professional writers to produce the routine reports, operational instructions and descriptive publications. But even in these circumstances, the individual scientist or engineer is still responsible for her own research or project reports. She is still the final source of information about her processes and discoveries.

Too many of us, who are quite willing to talk about our work, seem to feel that writing about it is someone else's job. Oral communication has its advantages, of course. The main one is that our listener's faces reflect understanding when we express outselves well, and warn us at once when we become boring or obscure. But it's a big world, and we can't speak to everyone in person.

Written speech is still the most universal and lasting form of communication. Also, because there is a certain finality about the written word, the act of writing makes us examine the fundamental truth of what we say.

Why, then, do so many of us shirk our writing responsibilities? Are we lazy? Are we afraid of exposing ourselves? I suggest that we <u>are</u> afraid, and fear makes us lazy.

We are afraid of being misunderstood. We are half-convinced that technical writing is inherently so difficult to read that the reader is bound to think little of us. There is no simple cure, but we can begin by trying to understand what it is that makes a paper readable.

> Consider the last technical paper you read. If you liked it, it must have been informative and logically organized. But more than that, it must have discussed a subject that interested you in terms that were familiar to you. You were the intended audience.

A readable technical paper, then, must be (1) informative, (2) logically organized, (3) intended for a particular audience. These requirements are interdependent, and apply to all forms of non-fiction writing. The third one, however, poses special problems for the scientific writer.

The language of science is a formidable barrier to the nonscientist. Even within the scientific community, each discipline has its own specialized vocabulary.

We are all familiar with the process of relating new ideas to what we already know. We are aware that learning a new skill, or expanding an old one, usually involves learning new definitions. The words may be the same, but a new context can either restrict or expand the old meanings. Therefore, we should try to give our readers the chance to hang new ideas on old familiar hooks.

Wilson Follett felt that all writers should strive to be considerate of their readers. He put it this way:

"We change our verbal as well as our facial expressions when we pass from a wedding to a funeral. In personal relations, this adjustment is called tact."

Writing mechanics are, I believe, the least of our problems. We can all read and write in our own language, and we can tell when a sentence makes sense. If we are in doubt about grammar or punctuation, we can usually find the answers in an office secretary's handbook. Beyond that, there are many textbooks available to help you learn more advanced writing skills. If you write in English, I recommend "Better Business English", by George Classen. Mr. Classen, who is a Canadian and a professional technical writer, has a wry wit and keen phychological insight.

When the day arrives in which you can no longer put off writing your next report, ask yourself these questions before you begin to write:

(1) Who will read the report?
(2) How much does he already know?
(3) What do you want him to know?

When you are satisfied with your answers, you will be well on the way to writing a good, readable report. For example:

If you are writing only to your boss, you can safely assume he knows the background of your project and understands its tech

nical terms. Therefore, there is no need for detailed explanations. You can state your facts simply, probably in chronological order, and end with the briefest of summaries.

If you are writing to engineers in other departments, and you want them to coordinate their work with yours, more explanation is necessary. Be sure they understand the reasons for decisions you have had to make. Indicate the areas where compromise or adjustment is possible. Write about one problem at a time and then, if necessary, point out the relationships between problems. Summarize carefully, making sure you have emphasized the most important points.

If your report is a routine one, you can usually follow established patterns. But, some of the traditional ways of presenting technical material are now being questioned. Richard M. Davis reported recently, in the "IEEE Transactions", on a series of experiments on the effectiveness of technical writing. A technical description of a fairly simple mechanical device was prepared in three ways, and circulated among over 2300 readers in nine levels of technical education. The results contained some surprises:

(1) The introduction did not increase comprehension in any of the audiences tested.
(2) When sizes and shapes were presented by drawings alone, the material was read more quickly than when they were presented by verbal description alone, or by drawings plus verbal description.
(3) Verbal description, when it accompanied the drawings, did not increase comprehension.
(4) The structural aids (introduction, headings, paragraphing, etc.) were of some benefit to some audiences, but not to the extent that was expected. They were overwhelmingly overpowered by the effect of the drawings.

Mr. Davis is planning further experiments in this field. But for now, your best guide to organizing your material is common sense. You can do it well, if you remember who you are writing to, and what you want them to know.

Don’t expect your first draft to be perfect. The first draft is what electronics engineers call a "breadboard model", a way to find the flaws in your ideas before you are committed to anything. Most of us have to write and rewrite and write again.

It often helps, on the first draft, to use the "examination paper" technique. That is, put down everything you can think of that pertains to the subject. Deliberately over-write. Then set the draft aside, and think-about other things for a while. When you do come back to it, your subconscious mind will have done some sorting and sifting. That is the time to cull away the Unessentials.

If there are professional writers in your organization, show them your second draft. Experienced editorial comment is always useful. Should their suggestions seem illogical to you, it probably means you haven't said what you meant to say. Try again, until you and your editors are both satisfied.

Examine your final draft for answers to questions such as these:

(1) Did you provide enough background material? You are at the end of an investigation, but your reader is at the beginning.
(2) Did you define unfamiliar terms?
(3) Have you used more words than necessary? This sin, called pleonasm, is an insult to your reader's intelligence.

Then, if you have done the best you can, stop. The report is as readable as you can make it, and the rest is up to your audience.

The reactions of your readers will help you to develop a "check list" of your own. The favorite of a writer friend of mine is only one sentence long: "When you are up to your ass in alligators, it is difficult, but not impossible, to remember that your initial objective was to drain the swamp." He keeps it pasted on the front of his typewriter.

Good, readable prose results from observation and practice. No one becomes a good writer automatically, any more than one can become a good driver automatically. But if you write as often as you can, and you keep the needs of your audience firmly in mind, your writing will quickly become more readable.

You can write well, if you will take the trouble, and the rewards are both personal and professional. To quote from the journals of Jules Renard:

"Remember that failure is not your only punishment for laziness; there is also the success of others."

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SATELLITE AND GEODESY

by Suria Tatevian

Astronomer Geodesist since 1962, Candidate Technical Science Research Associate of Astronomical Council of the USSR Academy of Sciences

Verbal communication

Let me tell you a few words about a very ancient engineering problem: geodesy and metric.

The first geodetical measurements were made in Africa about 4000 years ago, but I must say to you with my great regret that very little progress in matters of geodetical measurements were achieved till in the middle of our century. By the first Sputnik launching, October 1957, opened the space era and since then more than a thousand artificial bodies have been successfully brought into orbit. Most of them have done essential services in many domains of our knowledge of the universe.

Today we have heard an interesting report of Maria Vadnjal about the use of satellites in communications. For geodesists, as for many other scientists, satellites signify a completely new advanced pace of research as they provide observations and measuring possibilities not dreamed of before. The method of so-called space-geodesy, based on simultaneous tracking of artificial satellites from several ground stations is very promising and can be useful in solving a number of practical problems. It may be used in particular for geodetic base work, for aerophotographic surveys in places difficult of access, for the adjustement of islands to a continent and for position determination of individual geographical points in such regions as the antartic.

The method is rather simple and allows to work quickly, it is a very economical one and provides the high accuracy, ten to fifteen meters about. The method is particularly advantageous to be applied in developing countries with vast territories.

Space geodesy allows to measure distances between tracking stations, separated by the oceans, that will allow to solve in future the problem of the movements of ' the continent. But this problem, as well as many other astronomic cal and geophysical problems cannot be solved in the frame of one country only. They require cooperative work of scientists in many countries.

The history of the development of studies in this domain shows how eager scientists of different countries are to cooperate. The excellent examples of such cooperation are two scientific programs of satellite geodesy, which are carried out now. The first one, Isagex, initiated by the French Committee of Space Research was continued from January till August of this year. In this program about forty stations of twenty countries take part; the large optical cameras from the USSR, USA, France and other countries and lasers were used.

The second program of large geodetical traverse artic, antartic was initiated by the Soviet Union. This program started last year and will continue about two or three years. Now optical stations of the USSR, Finland, Poland, Bulgaria, Rumenia, UAR, Ciad, Somalie, France and others take part in the program.

Optical tracking of satellites is a classical example of international scientific cooperation in which all participants are equally responsible for the successful solution of the problem. There are no main or secondary participants: all observation of data are equally valuable if they are obtained wi1h the necessary accuracy. Organisation of stations for optical tracking is accessible to every country. Intensive results in this respect the experience of the Soviet Union in the organisation of joint stations for photographing the territory of the cooperating countries. The USSR Academy of Sciences provides the stations with the scientific equipment, including new Soviet cameras, and arranges the training of local observers in the method of tracking. The observations are carried out jointly and used after jointly on equal ground.

Finishing my report, I should like to say that a lot of soviet women take part in space investigations, one of the most actual and perspective domain of the human activity. Everybody knows about our astronaut, Valentina Tereshkova, and I know many women scientists who take part in space research and many women observers who work at our stations in our country and abroad. Their work is very useful for this space research.

T B 15

THE CONCORDE SUPERSONIC TRANSPORT AIRCRAFT

by Carolyn Schofield
(Senior Sales Engineer/ Olympus 593)

Rolls-Royce (1971) Limited
Bristol Engine Division
Bristol
England

BIOGRAPHY

The author has an Honours Degree in Engineering Science from Oxford University and completed an apprenticeship with Bristol Siddeley Engines Limited (now The Bristol Engine Division of Rolls-Royce). She spent several years development testing aircraft gas turbine engines, and in particular worked on the Olympus 593 engine for the Concorde supersonic transport aircraft from the start of its test programme. Two years ago she transferred to the Rolls-Royce (Bristol Engine Division) Marketing Department, and is now a member of the technical sales team for the Olympus 593 engine.]

SUMMARY

Speed is what civil aviation is in the market to sell, and Concorde, as already demonstrated by Mach 2 test flying, will halve intercontinental flight times. The history of the Anglo-French project is traced back to 1956, and the factors influencing the choice *of* cruising speed, material, aircraft configuration and power plant are discussed. While the generally conventional design and operational aspects *of* the aircraft are stressed, certain design features peculiar to supersonic operation are described. Progress in the development programme is reported with particular reference to the subjects *of* sonic boom, airport noise and pollution. Discussion *of* the commercial impact *of* supersonic travel on both passenger traffic growth and airline economics includes a suggestion for a new type *of* fare structure. Concorde will bring an increased market and profit to its operators by offering a fifty percent time-saving to its passengers.

THE CONCORDE SUPERSONIC TRANSPORT AIRCRAFT

by Carolyn Schofield

Introduction

Civil aviation maintains an expanding market by selling speed. Concorde, cruising at twice the speed of sound, about 1350 mph or 2160 km/hr, represents by far the most dramatic increase in cruising speed in the history of commercial aircraft. It will effectively halve all present day long-range journey times, bringing, for instance, Sydney within 15 hours travelling of New York, and reducing a transatlantic crossing to a mere 3t hours. Sustained Mach 2 flight is not a dream but a fact already amply demonstrated by the two Concorde prototype aircraft.

Concorde evolution

Progress in aviation is only possible by looking a long way ahead. It was as long ago as 1956, even before the general introduction of civil jets, that the idea of a supersonic airliner was first born in Britain. Following a symposium at the Royal Aircraft Establishment at Farnborough, a Supersonic Transport Advisory Committee, with representatives from the government, research establishments and the aviation industry, was set up to co-ordinate research and design (fig. 1). In 1959 the committee reported in favour of a long-range aircraft cruising at Mach 1.8, but more detailed studies showed that the suitability of the projected design improved up to and beyond Mach 2. Various designs by the British Aircraft Corporation included a Mach 3 steel and titanium aircraft, which they decided not to pursue for reasons which will be discussed in more detail later.

Meanwhile in France the possibility of a supersonic airliner had also been tackled, and design studies made by Sud Aviation. At the Paris Air Show of 1961, models of the Sud Aviation Super Caravelle and BAC 223 appeared for the first time, and showed that the two companies had finally arrived independently at very much the same design rules. In 1962, an Anglo-French agreement was signed for the joint production of a Mach 2 aircraft designed primarily for transatlantic operation, to fly non-stop from Paris to New York with a profitable payload.

17 YEARS OF SST EVOLUTION

1956	**FORMATION F UK SUPERSONIC TRANSPORT ADVISORY COMMITTEE (S.T.A.C)**
1959	**S.T.A.C RECOMMENDATION – Mach 1.8 FRENCH PROPSAL –Mach 2.0**
1961	**UK DESIGN STUDIES-Mach 2.0 and Mach 3.0**
1962	**ANGLO-FRENCH AGREEMENT –Mach 2.0**
1969	**FIRST FLIGHT**
1973	**ENTRY INTO SERVICE**

Figure 1

THE STIMULUS OF SPEED				
	SST		**Subsonic Jet**	
	hrs	**mins**	**hrs**	**mins**
London-New York	**3**	**28**	**7**	**17**
Sydney-London	**15**	**13**	**29**	**34**
Los Angeles-Tokyo	**6**	**30**	**13**	**50**
New York - Frankfurt	**3**	**45**	**7**	**30**
San Francisco-Honolulu	**2**	**25**	**4**	**55**
(Note: these times include a 45 mins allowance for transit stops)				

Figure 2

Four companies were involved, Sud Aviation (now Aerospatiale) i1nd the British Aircraft Corporation combining to produce the airframe, SNECMA in France and Bristol Siddeley (now Rolls-Royce) in Britain producing the engines. The fifty-fifty development and manufacturing split between the two countries was so arranged as to take best advantage of the experience and facilities of each of the four companies and to avoid duplication. Assembly of air frames and engines is completed in parallel in both countries, as is flight testing and engine bench testing.

Technica1 collaboration between the four companies already existed before the Concorde project, but has been greatly increased and strengthened by it. The continuing success of the Concorde programme is testimony to the excellent co-operation between the two countries and has undoubtedly been a spur to further collaborative projects.

Choice of cruising speed and aircraft configuration

Supersonic flight was already routine for military aircraft and there was no logical reason why civil flight should be limited to the speed of sound. People travel in order to arrive at their destination and the sooner this objective is achieved the better. Why else do we choose express trains, buy fast cars and chafe in traffic jams? Figure 2 shows the reduction in intercontinental flight times of Concorde cruising at Mach 2 compared with existing subsonic aircraft. A transatlantic day trip becomes a reality while a transpacific flight is shorter than today's Atlantic crossings. The shorter flight times also permit improved frequencies and avoidance of curfew or peak periods at busy airports.

Why then limit Concorde's cruising speed to the Mach 2 region? As cruising speed is increased the proportion of the flight spent at that speed becomes smaller and that spent in climb and descent becomes greater. It follows that the return in terms of time saved diminishes with increasing speed. In fact the time advantage of a Mach 3 over a Mach 2 aircraft on, a 3000 mile (5000 km) sector is only 20 to 25 minutes; that is an aircraft 11/2 times faster than Concorde would save only one eighth of the journey time. Because of increased kinetic heating Each 3 aircraft must be constructed of stainless steel and titanium, while up to about Mach 2.3 conventional light alloys can be used. It was decided that the time-saving and slight overall efficiency improvement by flying at Mach 3 did not justify the increased development cost of a steel and titanium structure, and Concorde was therefore designed as an aluminium alloy aeroplane with a maximum speed of Mach 2.2.

Among other rejected design concepts was any form of wing variable geometry because of increased weight and complexity. Concorde's slender delta wing (fig.3) was designed to give the least theoretical drag in supersonic flight. Refinements at the wingtips and leading edge improve controllability at low speeds without incurring a performance penalty at Mach 2. Comparison of Concorde with a DC 8 aircraft (fig.4) emphasizes Concorde's relatively narrow wingspan.

Design features peculiar to supersonic operation

In spite of its distinctive appearance Concorde is generally similar to conventional aircraft in design and construction. At airports it will comply with normal Air Traffic Control regulations in the same way as subsonic aircraft and if required it can cruise subsonically with very little penalty in fuel consumption. The differences arise from the wide range of conditions encountered

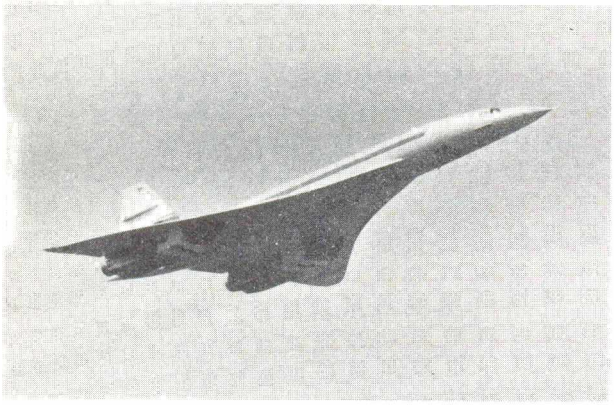


Figure 3

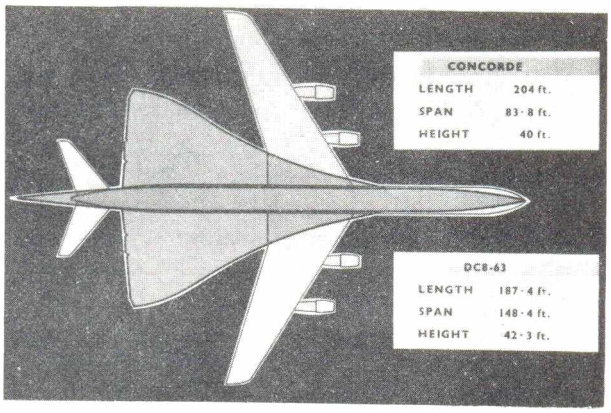


Figure 4

between take-off at sea level and Mach 2 flight at 60,000 ft (18.300 m). The aerodynamics must be more complex in order to reconcile the conflicting requirements of economical performance in supersonic cruise and good handling at low speeds. Structurally the aircraft has to withstand much greater skin temperatures and thermal stresses than in a subsonic application.

Two features are of particular interest; the fuel trimming system and the much publicised "droop nose" Besides supplying fuel to the engines. Concorde's fuel system is used both to dissipate excess heat from the air conditioning, hydraulic and lubricating oil systems by means of heat exchangers and to adjust the aircraft's centre of gravity by means of trim tanks. In changing from subsonic to supersonic flight and back a substantial change in the position of the aerodynamic centre of the aircraft occurs and must be compensated for by a change in position of the centre of gravity. Figure 5 shows how fuel is pumped rearwards during transonic acceleration and forwards during deceleration using front and rear trim tanks. This system obviously has no drag penalty as would any system of external trimming.

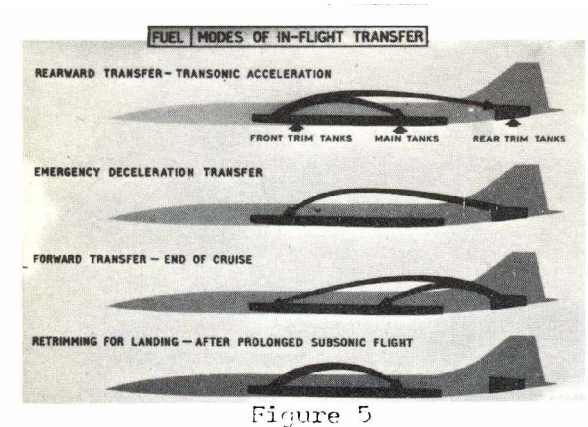


Figure 5

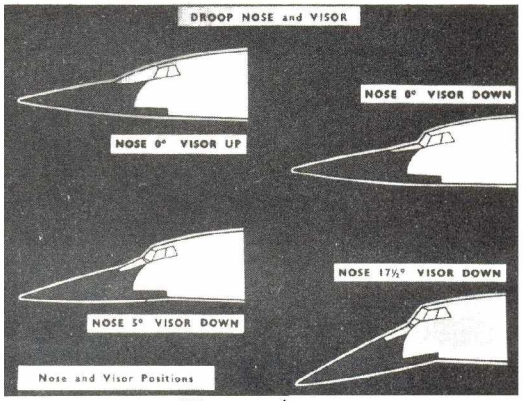
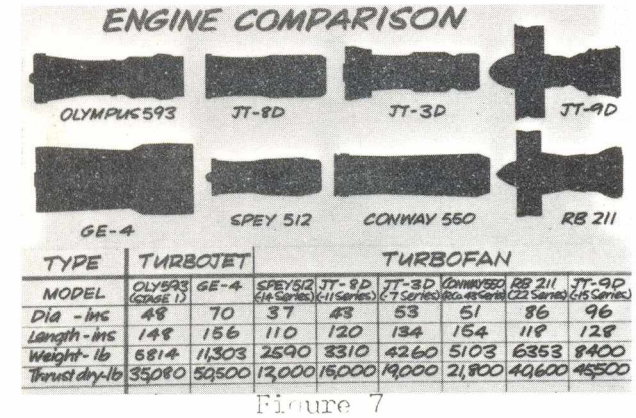


Figure 6

The droop nose mechanism (fig. 6) combines a clean aerodynamic shape for cruise conditions with excellent visibility at take-off and landing. For normal flight the nose is at 0° and the visor up. At take-off and landing the visor is lowered to improve visibility and the nose lowered 5° down for take-off and 17 1/2° down for landing. The two mechanisms are independent so that the visor can be lowered without drooping the nose if required.

Concorde is powered by four Olympus 593 engines installed in paired nacelles under the wings. An all - imported design consideration of any aero engine is its thrust to weight ratio: for a supersonic application the ratio of thrust to frontal area is of equal importance to minimize drag. Therefore, while subsonic conditions favour engines with large fans and high bypass ratios for maximum efficiency, supersonic conditions require a pure jet engine with no bypass air.

Figure 7 illustrates this difference by comparison of the Olympus 593 for Concorde and the GE4 for the HS SST and two high thrust subsonic engines, the JT9D for the Boeing 747 and the RB211 for the Lockheed Tristar. All eight en- engines show have similar thrust to weight ratios, between 4 and 6 1\2, whereas thrust/frontal area varies between the extremes 6.0 lb/in^2 (0.42 kg/cm2) for the JT9D and 19.4lb/in2 (1.36 kg/cm2) for the Olympus 593.



TYPE	TURBOJET		TURBOFAN					
MODEL	OLY593 (STAGE 1)	GE-4	SPEY512 (-14 Series)	JT-8D (-11 Series)	JT-3D (-7 Series)	CONWAY560 (RCo.43 Series)	RB 211 (-22 Series)	JT-9D (-15 Series)
Dia - ins	48	70	37	43	53	51	86	96
Length - ins	148	156	110	120	134	164	118	128
Weight - lb	6814	11,303	2590	3310	4260	5103	6353	8400
Thrust dry - lb	35,080	50,500	12,000	16,000	19,000	21,800	40,600	45,500

Figure 7

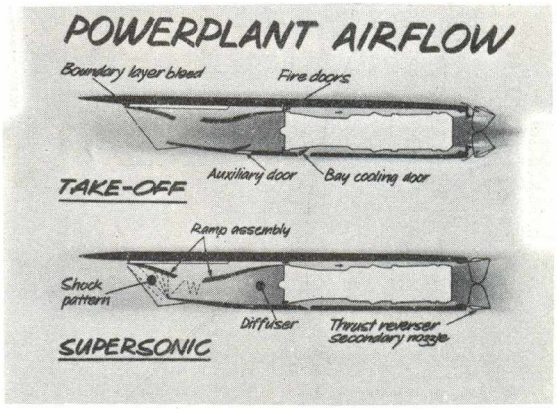


Figure 8

Another major difference between a supersonic and subsonic power plant is the length and complexity of the engine intake and exhaust system (fig. 8). The intake incorporates moving ramps to slow the incoming air from twice the speed of sound at the intake lip, to about two thirds the speed of sound at the engines face, since a compressor has not yet been designed to accept both supersonic and subsonic flow. The ramp position adjusts automatically to the "swallowing capacity" of the engine, under widely varying flight and ambient conditions. Similarly two variable exhaust nozzles automatically ensure correct compressor speed matching and optimum expansion of the jet at all flight conditions. In addition one of those nozzles permits a simple on /off reheat system to be used to augment thrust during take –off and transonic acceleration, while the other doubles as a thrust reverser on landing. Spade silencers project into the jet at take – off to accelerate mixing and so reduce noise, and are retracted after the take - off phase to avoid the associated thrust penalty.

Deceleration of the airflow through the intake at supersonic cruise, with the maximum possible pressure recovery, has the desirable effect of producing a high proportion of the overall compression ratio in the intake. Less desirable is the associated temperature rise to 127° C (260° F) at the engine face, which has necessitated the use of special materials in the engine and development of special oils. Figure 9 shows the supersonic Olympus 593, compared, from the point of view of materials, with its subsonic ancestor which powers the Vulcan bomber. Temperature condition in the Olympus 593 compressor dic

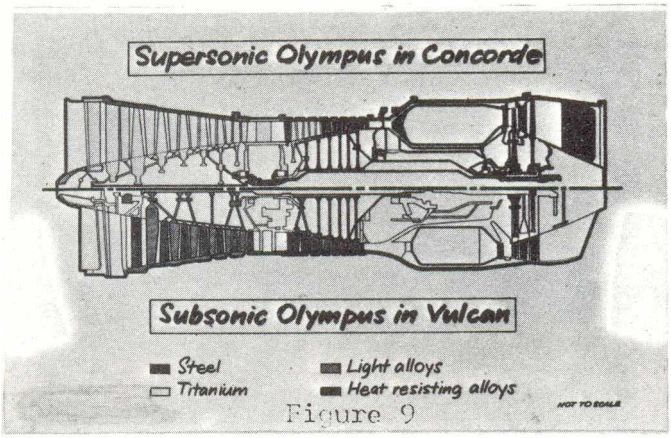


Figure 9

tate the extensive use of titanium to achieve adequate creep strength as well as low weight. Nimonic alloy is used for the rear HP compressor stages where the temperatures are too high for titanium.

Development programme

Over 600 hours flying already achieved on the two prototypes has included a high proportion at supersonic speeds and many hours at Mach 2. Flutter testing and handling over the entire operation range have given good results, and the aircraft and engine performance at Mach 2 are in line with predictions. The behaviour of the aircraft during simulated one two engine failures throughout the flight envelope has been excellent. Several airline pilots who have flown Concorde in the early flight development stages have been unanimous in praise of its handling characteristics.

The programme of testing to achieve a Certificate of Airworthiness in 1974 is comprehensive and stringent. The remainder of the 4000 hours flying will include such tests as tropical and icing trials, handling tests under all possible conditions, and finally route-proving tests before the aircraft goes into commercial service. Seven aircraft are involved in the flight test programme and a further two will be used purely for static and fatigue tests. In addition to the two prototypes already flying, there will be two "pre-production" aircraft flying by the middle of the next year and the first three production aircraft will join the certification programme in the first half of 1973.

In parallel with the flight testing there is a full programme of static and fatigue tests, wind tunnel rig tests and exhaustive proving of all the systems. Much of this work is done in association with government research establishments in both countries. The Olympus 593 engine has already completed over 12,000 hours of bench running, including a high proportion at simulated Mach 2 and altitude conditions. A number of special airworthiness requirements such as bird strike and ice ingestion tests and a variety of failure simulations have been demonstrated satisfactorily.

Concorde and the environment

In the course of the development programme a great deal of work is being concentrated on environmental issues: sonic boom, airport noise, and atmospheric and high altitude pollution.

Sonic boom is caused by a shockwave from an aircraft f1ying at supersonic speed. Concorde prototype flight test measurements have shown the overpressure. Generated to correspond to 1 millibar lasting about 250 milliseconds, which is one hundredth of the threshold of painful sensation to the human ear. The effect on buildings approximates to that of a 30 mph (50 km/hr) wind. It is true that a number of complaints and claims for damage have been received, but a significant proportion occurred on occasions when a flight was scheduled but for some reason did not in fact take place! Sharp turns and acceleration can have a focusing, and four to sixfold magnifying, effect on the boom, but routing can generally be arranged so that focusing occurs over the sea.

Nevertheless route studies and sales forecasts are currently based on the assumption that supersonic flying over inhabited land will be prohibited. Figure 10 demonstrates that this is not unduly restrictive to Concorde operation.

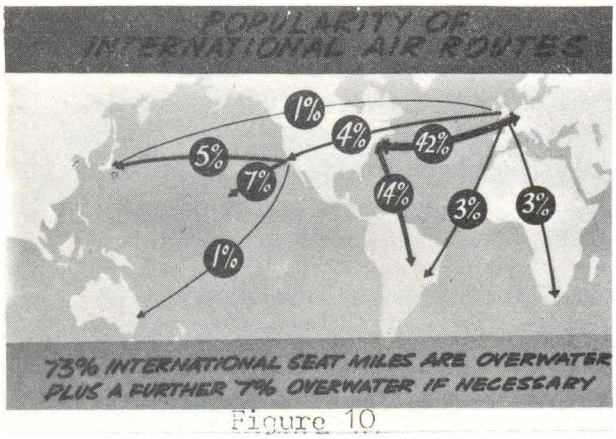


Figure 10

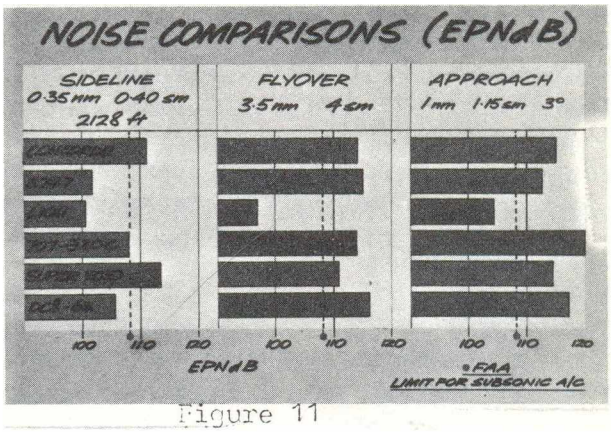


Figure 11

Airport noise, although a very real problem, is not peculiar to Concorde, which is not noisier than existing aircraft (fig. 11) and will not stand out from the noise environment in which it enters airline service. However, we are all very conscious that this total noise environment needs to be reduced and every effort is being made to reduce Concorde's noise to a minimum. Sophisticated noise research facilities in England and France have contributed to an extensive programme in the course of which over 250 different silencer designs have been tested. Concorde has certain intrinsic features which assist the silencing task: high take-off power gives a steep climb which reduces noise duration, and variable exhaust geometry allows the jet conditions to be varied in such a way to reduce noise.

Jet aircraft are an extremely clean form of transport and Concorde is no exception. Aviation as a whole contributed only 0.1% to total world pollution in 1970 compared with 42% contributed by motor cars. Exhaust emission is at its worst during taxiing, but many tests have shown that the air around airports is cleaner then that of the cities they serve. None the less a new combustion system has recently been developed for Concorde's production engines to eliminate smoke. Its effect is shown in the "before" and "after" illustrations in fig.12.

High altitude pollution is a comparatively new subject and hence one which gives rise to wild speculation. British Aircraft Corporation, Aerospatiale and

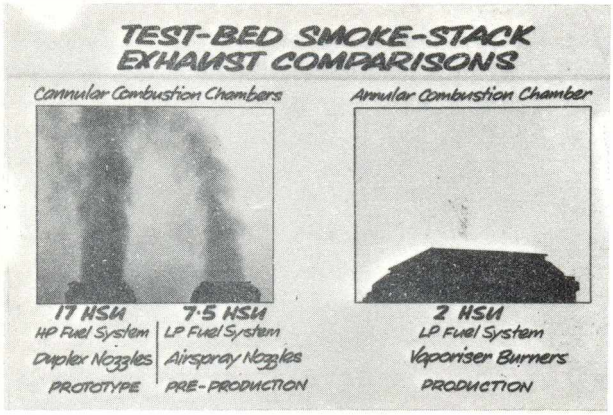


Figure 12

the Boeing Aircraft Company are pooling their knowledge and resources on this subject and maintaining close contact with the various establishments engaged in further research. It is worth noting that military supersonic aircraft have been operating well into the stratosphere, at higher altitudes than Concorde, for many years with no detrimental climatic effects. On the basis of available evidence the chances of supersonic aircraft 'causing any significant interference with the environment would seem to be minimal.

Concorde in commercial operation

To be a commercial success an aeroplane must both please the passengers and bring profit to the airlines; Concorde will do both. Today's passenger traffic is classified on the basis of leg room and food, but the first class cabin still arrives at its destination at the Same time as the economy class. Concorde offers a new possibility to the travelling public: an increased fare to halve their journey time.

It is a matter of historical fact that the introduction of an aircraft offering a reduced journey tim has always been accompanied by a sharp rise in passenger demand. This was particularly true of the wide-scale introduction of jet aircraft in the early 60's, which also created a precedent for putting a surcharge on speed. It may be that the current stagnation in air traffic growth is due to the lack of any further speed injection since that date.

Much thought is being given to the best way of integrating Concorde into an existing subsonic fleet. Obviously if it were operated at the same fares it would attract too much traffic away from the subsonic aircraft. One alternative, illustrated in figure 13, is to operate Concorde and high capacity subsonic jets each as single class vehicles. This will allow each aircraft to operate most economically in the role to which it is best suited. To the large section of the travelling public for whom time is money, Concorde will sell speed and improved frequencies, while the slower subsonic jet will cater for those for whom the fare is the limiting factor. The subsonic aircraft will increase its profit ability by having more seats in an all-economy. layout while Concorde, carrying a high proportion of today's first-class and business traffic, will be a superior class vehicle commanding high load factors. It is estimated (fig. 13) that this type of mixed fleet would give an increase of 3 l/4% return on investment over an all-subsonic fleet at a 60% load factor.

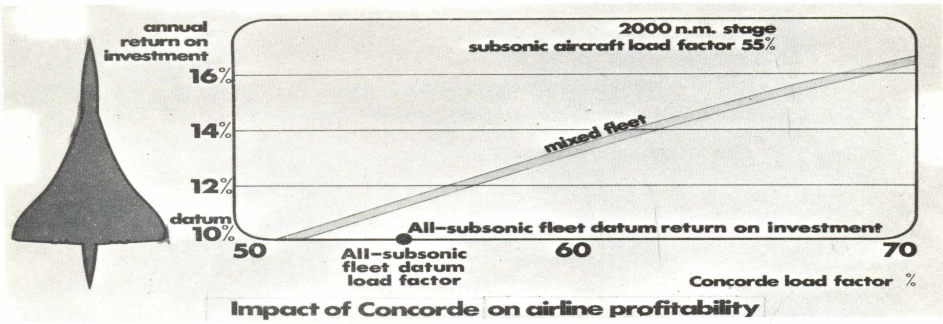


Figure 13

The airlines holding options for Concorde are shown in figure 14. They have all been closely involved with the project from the beginning by means of a number of manufacturer / customer committees meeting at regular intervals, so that Concorde is in a very real sense a "customer-designed" aeroplane.

The introduction of the Supersonic age opens up new possibilities in the drawing together of the continents. Concorde as its forerunner will be not only a unique combination of grace and power, but a practicable and profitable transport vehicle.

CONCORDE SALES

PAN AM	**8**	**UNITED**	**6**
B-O-A-C	**8**	**AIR-INDIA**	**2**
AIR FRANCE	**8**	**JAPAN**	**3**
CONTINENTAL	**3**	**SABENA**	**2**
TWA	**6**	**EASTERN**	**6**
AMERICAN	**6**	**BRANIFF**	**3**
MIDDLE EAST	**2**	**AIR CANADA**	**4**
QANTAS	**4**	**Lufthansa**	**3**

TOTAL CONCORDE SALES 74

Figure 14

Acknowledgements

The author wishes to thank the directors of Rolls-Royce for permission to publish and is grateful to colleagues in Rolls-Royce and British Aircraft Corporation for their help in producing this paper. The opinions expressed are the author's own and do not necessarily reflect those of the Concorde aircraft or engine manufacturers.

SEMIOLOGY AND SYMBIOSIS

Lois Ventris

A.A. Dipl. A.R.I.B., A.

Biography

The author studied Fine Arts at Vienna University, Architecture and Art History at the Sorbonne, Architecture and Archaeology at the London Architectural Association and Archaeology at the London Institute of Archaeology. She is conversant in nine languages.

She received a tenure appointment at University College in 1962. In 1968 she was a visiting professor at the College of Environmental Design, University of California at Berkeley, and in 1969 she spent a year at the Athens Center of, Ekistics as a faculty member in the Education Division and a research fellow in the Documentation Division.

A member of the Royal Institute of British Architects, Mrs Ventris is active on its library board, books committee, professional literature committee and documentation sub-committee. She is also a member of the University Of London Board Of Studies for Architecture and Town Planning.

Summary

The author proceeds from the very generalised theoretical concepts of anthropology and linguistics, hopefully thereby defining a structured analysis, using structural anthropology and structural linguistics.

If the series of studies in subjects that assume a "structure" could be applied to architectural theory, it could form the essence of a new theory of architectural training: a framework identifying such a potential skeleton is the thesis proposed here.

Since language is the predominant mode of communication by mankind, its importance cannot be overemphasised for the architect who is attempting to understand symbolic processes so that he can improve his design methodology.

SEMIOLOGY AND SYMBIOSIS

Lois Ventris

In theorizing and conceptualising an approach to any specialised subject the first question to be answered is whether one proceeds from the general to the particular or viceversa? In this particular case I have chosen to proceed from the very generalised theoretical concepts of anthropology and linguistics, hopefully thereby defining a structured analysis, using structural anthropology and structural linguistics. That this is not a clear-cut process, I will define by quoting as my theme Jerome Bruner's statement:

"Since childhood, I have been enchanted by the fact and the symbolism of the right hand and the left - the one the doer, the other the dreamer. The right is order and lawfulness, Ie droit. Its beauties are those of geometry am taut implication. Reaching for knowledge with the right hand is science. Yet to say only that much of science is to overlook one of its excitements, for the great hypotheses of science are gifts carried in the left hand.

On the left hand we say that it is awkward and, while it has been proposed that art students can seduce their proper hand to more expressiveness by drawing first with the left, we nonetheless suspect this function. The French speak of the illegitimate descendant as being a main gauche, and, though the heart is virtually at the centre of the thoracic cavity, we listen for it on the left. Sentiment, intuition, bastardy. And should we say that reaching for knowledge with the left hand is art? Again it is not enough, for as surely as the recital of a day-dream differs from the well-wrought tale, there is a barrier between fantasy and art. To climb the barrier requires a right hand, adept at technique and artifice."

The two-world syndrome, to paraphrase C.P.Snow, is a necessary part of architectural education. In quoting Bruner I am elucidating part of this problem as defined by someone who is exploring the philosophical roots of the unconscious processes involved in creating. "On. Knowing" his book is called. However,' this is no new concern; in 1950 the IIT stated:

"This education enables the designer to approach intelligently and imaginatively the general problems of the ever-changing requirements in the social economy and the coordinated techniques involved."

This is one of an infinite number of similar statements which could be taken from most classical definitions of intention. It is not in fact very different from the dictionary definition of SOPHIST: -"One of a class of teachers of rhetoric, philosophy, AND THE ART OF SUCCESSFUL LIVING in ancient Greece, who became prominent about the middle of the 5th Century BC. They were the first to offer anything approaching systematic education beyond the elementary branches."

"The interest and the emphasis should lie in the concern, the very real concen1, with all forms of living."

The concern with the choices that lie within this world are, consciously or unconsciously, the basis of design. In this sense, clothing, cooking, cars are all parts of the communications system: - not just the physical envelope, and its furnishing that architects or so-called environmental designers are involved in projecting onto the society. It is this feedback, this demand for expression, that different social systems have evolved. Within the opportunities offered, man has evolved a very complex set of requirements; these requirements are full of atavistic elements. Fortunately: and this is the reason for his survival, man is essentially adaptive to physical environment, and mentally compensates for many discomforts involved by philosophical or material contexts. That there is no need for many of these physical discomforts may be part of his psychological needs; certainly in Western philosophy "il faut souffrir pour être belle." The legacy of Calvinism, of the Anglo-Saxon need to suffer, is very much part of the story in Western societies.

If we were to take Japanese Shintoism, or Zen Buddhism, we would find a different philosophical story; but not so different a representation now. Because the physical context these exist in are still not particularly comfortable or controlled; it is the attitude of mind that is interesting. Remembering a fierce argument in a Zen Buddhist temple referring to the biblical phrase: "Am I my brother's keeper?" I would say this is a totally Western concept; the interest lies in that achieving Nirvana, or to put it crudely, improving oneself, is assumed to be a benefit to society. Buddhist may believe in reincarnation, the net result is very similar to believing in purgatory: the individual behaves according to his beliefs, and in doing so, affects society. Society which has to let him live.

Perhaps the most complicated issue is when society can afford to let people die. And this is particularly relevant to the present-day issues, whether Buddhist or not; a dead martyr may be more useful than a living person. History could answer in the affirmative; but these are individuals and if they die dramatically enough, they may serve this purpose.

But many, many people are involved in a living death and this may be the most savage comment on today's environment. Because they don’ t know it: they don't know what living really means. The material advantages are so publicized, so generally accepted as necessary, that this may well be called a social cause, and has become one in America. The compensation here lies in social acceptance of these norms as desirable. And the physical expression of such desires and needs are what the designers are asked to provide. Mobility, whether in living or moving, is a primary criterion, and one which is amply demonstrated. Some of this demonstration is fascinating economically; that large percentages of money and of space are required to provide this, no one can argue. Fascinating physically, too; the great freeways and bridges and the self-contained units with

air conditioning that go camping in the wildest areas of the USA the citizens have an all-equipped mobile home, to supplement their temporary static home.

In the past, nomads had their own ethics; this society has created a nomadism without ethics. It makes the unifying concepts for responsibilities extremely difficult to operate, especially where there is no forum for discussion, and no particular destination on arrival pattern. TV is no substitute for involvement. The problem remains - what environment, what settlement form does such a society need? And this is the concern of designers of the built environment.

Since it is mobile and non-aligned, there is very little continuous use or continuous administration. And yet, atavistically, this society clings to the idea of static monuments or memorials. Designers are not necessarily educated to provide these; but these are what they are often commissioned to produce. This shows a basic dichotomy in many fields, not least in those professionally concerned in educating designers to be concerned with an understanding of the total concept, the setting for this physical answer. That it should be concerned with the future is a truism; hence the need for a structured understanding of the whole.

It is in other disciplines that we may find this; in the work of Levi Strauss in Anthropology, since his approach is holistic and integrative; he conceives of anthropology in the broadest sense as the study of man, past and present, in all his aspects: physical, linguistic, cultural, conscious and unconscious. To quote from the translator's preface to Structural Anthropology, he emphasises the close relationship between fieldwork and theory, between the description of social phenomena and structural analysis, as two phases of the same process. .. at the same time, a systematic, comparative, and generalising perspective must complement the close range view so that the patterns which underlie the various manifestations of social life may be uncovered.

Pattern-making, Gestalt theory; all these have influenced education, and this knowledge has often become an education in itself; an expertise in non-identified forms. Whilst this has been valuable, and may well form an introduction, it cannot form a structured answer. In the past half-century the conception of the learning process as depicted by psychology gradually has shifted away from an emphasis upon the production of general understanding to an emphasis upon the acquisition of specific skills. This has been paralleled by developments in linguistics, in cybernetics, in anthropology too.

In searching for this necessary identification, architectural theory has been misled. In searching, and in offering, design solutions, it has followed a minimal adherence to science in various forms, but its formal answer has been eclectic. Revivalism, wether of architecture based on local vernacular architecture or nomad architecture with its derivation from applied technology as in Thinkbelt, is a temporizing architectonic answer. Its symbolism may catch the affection, or the interest, of various mobile groups, its intellectual "aficionados" may sell it well to a series of buyers.

If this series of studies in, subjects that assume a "structure" could be applied to architectural theory, it could form the essence of a new theory of architectural training: a framework identifying such a potential skeleton is the thesis proposed here.

Starting with the word “symbiosis" which means a living together (fr.Greek) in a broad sense the definition* of the term includes parasitism, or antagonistic, or anti-pathetic symbiosis and has various derivative forms

symbol, (French and Latin) meaning logic or symbolic logic

and philologically, pertaining to or designating a process, LANGUAGE or type of linguistic structure in which identification of meaning is indicated by internal changes of the radical element, i.e. inflexional languages as opposed to isolating or agglutinative language. The differences in derivation and relation ship are shown by symbolic change of the root (e.g. umlaut in German) or by fusional affixation. The analogue with architecture is clear: many buildings could be described thus.

We have learned too that the "arts” of sensing and knowing consist in honoring our highly limited capacity for taking in and processing information. We honor that capacity by learning the methods of compacting vast ranges of experience in economical symbols - concepts, language, metaphor, myth, formulae. The price of failing at this art is either to be trapped in a confined world of experience or to be the victim of an overload of information. What a society does for its members, what they could surely not achieve on their own in a lifetime, is to equip them with ready means for entering a world of enormous potential complexity. It does all this by providing the means of simplification most notably a language and an ordering point of view to go with the language.

The concept of culture has been the basic assumption of all anthropological studies and this concept is implicitly based on a definition of man which emphasises his extensive ability to symbolise and to bestow meaning to physical and social phenomena. Leslie White, an articulate anthropologist regarding this matter, maintains that the development of culture is completely dependent on man's creation and uses of symbols.

Beals and Hoijer, (authors of an elementary textbook in. anthropology) state that symbolising is essential to the development of culture in two ways: firstly symbolising makes it possible for man to judge the gap between discrete experiences and thus to learn from experience and communicate this learning to others. Therefore, an individual can know about an event vicariously through linguistic symbols, without personally experiencing it. Secondly symbolising enables man to transmit effectively culture from one generation to another.

The most prominent form of symbolizing among humans is language, reasoned by Greenberg in the following manner:

* Webster's New Int. Dictionary

"At the present time …it is probably more usual to phrase the difference between man and other species in terms of symbolic, as distinct from merely a sign behaviour . . . language has a unique role which results from its generality of reference and ontogenic priority in the life history of the individual. "

According to Alexander, the language of architecture determines the problems dealt with by the architect, rather than symbolically representing the problems he determines; he states:

". . . Once these concrete influences are represented symbolically in verbal terms, and these symbolic representations or names subsumed under larger and still more abstract categories to make them amenable to thought, they begin seriously to impair our ability to see beyond them. . . caught in a net of language of our own invention, we overestimate the language's impartiality."

Since language is the predominant mode of communication by mankind, its importance cannot be overemphasized for the architect who is attempting to understand symbolic processes so that he can improve his design methodology.

The architect must ask himself such questions as:
What are the categories an architect imposes on the environment when he conceptually isolates those variables which influence his design? Are the categories he uses the same as those of the standard culture in which he lives; or does he have special architectural categories? If so, how do these categories compare with what the social scientist knows of social reality? Do these categories when used in the design process achieve the desired results? Or as Alexander maintains, do these concepts or categories control the architect's perception of "fit" and "misfit" between form and its context?

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T C 3

COMPUTER BASED INFORMATION SERVICES ON THE COMPUTER AND INFORMATION SCIENCES

An International Resource for Social and Technical Progress

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Biography: Miss Margaret R. Fox was born and raised on a dairy farm in southern Wisconsin just 25 miles from the Mississippi River. She attended public primary and secondary schools, and received the Bachelor of Science degree from the Wisconsin State University at Platteville in 1940. She taught in rual school for three years interspersed with attending college, following which she taught three more years in public grade schools before joining the U.S. Naval Reserve (W.A.V.E.S.) in September 1943. After completing Officers' Candidate School, she attended Naval Radar Training Schools at Harvard University and Massachusetts Institute of Technology prior to serving as Radar Officer/Electronic Engineer in vacuum tube research at the Naval Research Laboratory in Washington, D.C.

Released to inactive duty in late 1946, she continued to work as a civilian at NRL in fire control radar research until May 1948, when she was employed to develop electronic text and training materials for the Bureau of Naval Personnel and the Navy's Bureau of Aeronautics. In September 1951, she joined the technical staff of the National Bureau of Standards in its Electronic Computers Laboratory where she served as Technical Assistant to its Chief for the next 15 years. Following the organization of the NBS Center for Computer Sciences and Technology in 1966, she was appointed Chief of one of its five divisions and was assigned the responsibility for establishing and operating a specialized information center for the computer sciences and information processing technology.

She is a member of the Association for Computing Machinery, American Society for Information Science, IEEE Computer Society, Pattern Recognition Society, Society of Data Educators, American Federation of Information Processing Societies and last but not least the Society of Women Engineers.

Summary of Paper: Two facts have become increasingly evident. First computers are being applied in every facet of human endeavor, from computing complex mathematical problems for scientific and social research and development; to presenting processed information for decision making by managers in industry, government and education; to providing supporting services for the general public in the areas of health care, medicine, insurance, transportation, education, pollution detection and control, ad infinitum. Secondly, information is rapidly becoming the most significant of the five economic factors that affect the lives and livelihood of everyone in the world, in both the highly developed and the developing regions. Used wisely, information can be a vital factor in achieving new levels of advancement on all fronts and especially in planning for progress. The role of the computer in increasing the rate of progress not only by processing information with fantastic speed and accuracy, but also by assisting in the transfer of technology along with telecommunication techniques is basic to such advancement.

COMPUTER-BASED INFORMATION SERVICE ON THE COMPUTER AND INFORMATION SCIENCES

An International Resource for Social and Technical Progress
by Margaret, R. Fox

In response to an advance notice of the aims and objectives of the First International Conference on Women Engineers and Scientists, the central theme for which was "Focus for the Future," Dr. Jerome B. Wiesner, who in 1964 was Science Advisor to the President of the United States, stated:

> This era is unlike any that the world has previously seen. Through science and engineering, we have an opportunity never before equaled to raise living standards, to battle disease and disability, to explore the frontiers of knowledge and turn nature to man's benefit . . . . These technological tasks such as economic development of new nations, feeding the hungry, meeting problems of environmental pollution, and preservation of peace in a competitive world require not only the expenditures of billions of dollars every year, but also the utilization of a vast amount of technical talent everywhere.

The intervening years have only served to reemphasize and make us more aware of the scope of the several tasks he identified on that occasion, and the Second International Conference addressed itself to one of them, the Application of Technology to World Food Problems.

The five economic factors that affect the lives of everyone, whether in a so-called developed or developing country, are (1) land, (2) labor, (3) capital, (4) management and (5) data, where data are defined as knowledge or information. Webster defines information as knowledge obtained from investigation, study or instruction. Information and freedom are interdependent. Used wisely and effectively, information can be the vital factor in freeing our society from many of its ills and can be instrumental in achieving new levels of advancement on all fronts and especially in planning for progress. Conversely, used unintelligently and ineffectively, information is just another barrier to the realization of human hopes and needs.

Information has been further defined as the data that allow us to make choices. Communication is the transfer of such data from one person to another. Unless at least one person has received, assimilated and understood a message containing meaningful data or their symbols, there has been no communication and hence no transfer of knowledge. The application of computers and communication techniques is essential to expediting technology transfer for and progress in each of the major areas with which this conference is concerned: the development, operation and control of energy sources; transportation vehicles and systems; housing and urban development; the control of major industrial processes; the design and implementation of ecological systems; and the broad area referred to as human engineering. The utilization of computer-based systems for information management and storage, combined with telecommunication techniques to provide for selective retrieval and dissemination of information, is basic to social and technical progress.

The first industrial revolution took place when man discovered how to convert chemical energy stored in fossil fuels into mechanical power. This discovery resulted in a tremendous expansion of man's physical capabilities. Today, the computer, which provides the means for extending man's mental self, is causing a revolution of even greater scope and is impacting every area of human endeavor as well as every region of the world. The electronic digital computer is a logic machine, a symbol manipulator, a control device and an information processing system. The startling impact which the computer has exerted on society in its brief 25-year history is perhaps best evidenced by the rate of its application to resource management throughout government, business, industry and education. Parenthetically, this year 1971 is the 100th anniversary of the death of Charles A. Babbage, credited with the original design of the automatic digital computer, and the 25th anniversary of the ENIAC, the first electronic digital computer designed and built by J. Pres per Eckert and John A. Mauchly at the University of Pennsylvania's Moore School of Electrical Engineering.

The problems and challenges which the ubiquitous computer poses for society in general are immense, and the shape of the future will be materially affected by society's ability to educate its members in the understanding as well as the use of this tremendous tool for expanding human capabilities. There is an urgent need not only to provide appropriate instruction to those who are likely to make direct use of computers, but also to provide everyone with an understanding of what these tools are, what they can do, and how they are affecting society. In the first instance, it may be of interest to cite a statistic provided by the American Association of Collegiate Schools of Business. In 1966, 11% of the associated schools required computer programming proficiency of their students; in 1970, just five years later, the percentage had risen to 62%. Likewise, a study undertaken by the Rand Corporation, cosponsored by the Carnegie Commission on Higher Education and the National Science Foundation, noted that in 1962 only 200 U.S. universities and colleges had computers but by 1969 some 1,250, or one-half of the nation's campuses, were using computers in the three areas of administration (30%), instruction (30%) and research (40%). In the second instance, a colleague at NBS concerned with consumer product evaluation and safety has noted that it is a small step for the salesman who now queries a computer to check its data bank whether a given model and color is in stock to also retrieve manufacturer's and other data on the characteristics of that model and thus become a tutor of the consumer in providing information which allows him to make an intelligent choice. This is not a trivial consideration when one realizes that in the U.S. alone over $100 billions are spent each 3ear for goods and services.

This, the primary problem faced by education today consists of determining the relevance of the computer to each discipline. At the same time, the educator is challenged not only to reveal how computer capabilities have been incorporated in the very organization, structure and application of all current knowledge, but to use the computer as a teaching tool. While mathematics, engineering and the physical sciences were initially the fields most directly affected by the ability of the computer to solve problems and process data, and to support the development of systems simulating segments of the

environment, techniques for storing and retrieving information and for exploring logical consistency have affected language studies and applications to the management sciences have impacted business, economics, administration and commerce, especially in decision making.

The computer and information sciences in combination is a service technology. This means that the relevant information is produced by two distinct groups of people: by computer scientists and engineers, and by users and managers of computers. In other words, in addition to there being a basic corpus of computer knowledge, information on computers and their utilization also appear in the literature on every other subject. A technology forecast for 1980 included such exciting prospects as (1) universal use of computers, freeing men's brains for pure research rather than even sophisticated mechanical use; (2) automated highways; (3) television-computer hookups for crime detection in banks and stores, and (4) television and picture-phones connected to interactive computer/communications systems available for home use. The computer industry is predicted to grow at an annual rate of some 30% for the next several years, doubling every three years for the near-at-hand future. Even now there are over 100,000 computers in use worldwide.

This means that the volume of computer information will also grow at an increasing rate. . As an example, the growth of computer journal publication over the past 20 years is indicative of the expansion to date:

1950	19 journals
1960	162 journals
1970	573 journals

It is a burgeoning portion of scientific findings now being reported in 60,000 journals, to which three new ones are added each day while only one dies daily. Over the past several years the need for more effective communication of scientific and technical information and data has been recognized throughout the information processing community. Effective communication has been challenged by the growth in volume and number of sources generating such information. Conversely, the rate at which scientific development and technological application can proceed frequently depends on the facility, speed and accuracy with which pertinent information can be procured and disseminated. Much of what we do or fail to do is based on information or, unfortunately, on its lack or misinformation. Thus we are concerned with the efficiency of communication.

Books, proceedings, reports, journals and other documentation are the common methods used in transmitting information. Oral communication, in the form of conferences, discussions with associates and, in general, interaction with other members of a group, is also important, but represents a relatively smaller amount of communication among scientists and technologists~ Since computer information has already become a large specialized subset of the total information resource of the world, it must be managed and utilized in the same way as men, money and materials. The application of, computers is unique in that it requires intellectual, engineering and administrative support of unprecedented magnitude. It has been stated that the health of

our planet depends in some way upon a balance of information processing power. We have passed from an economy of goods to an economy of knowledge. Knowledge has already become the key to productivity, competitive strength and economic achievement. In the U.S., the knowledge sector of the economy represented 1/4 of the Gross National Product in 1955. By 1965, its phenomenal growth accounted for 1/3 of the GNP and by 1970 had reached the 1/2 point. It is therefore both a duty to society and a challenging responsibility to utilize the unique capabilities of the computer for the timely provision of computer information to those who need it.

The information processing system is therefore the connecting link in the exchange of information. The corpus of recorded knowledge has been compared to a dinosaur whose extinction can be partially attributed to the fact that its brain could not control its unwieldy huge body. A collection of information can also become so huge that its parts cannot be controlled efficiently. Fortunately, relatively recent technical advances have made it possible to process information many times faster than the traditional library, with such disciplines as mathematics, chemistry, electrical engineering, computer technology and psychology contributing to the solution of the information processing problem.

The primary function of Government is to provide services. The Federal Government of my country is the largest single customer of the computer industry with its many agencies utilizing computers to enhance accomplishment of their diverse missions. To illustrate the growth of their application, in 1965 the annual inventory listed some 2,600 in use; just five years later the number had doubled with 5,277 listed in the 1970 inventory. They currently represent the annual investment of over $2 billions each year for hardware, software and services. The concern of our Congress that every effort be made to use them efficiently and effectively resulted in passage of Public Law 89-306 in 1965 which among its several provisions charged my agency, the Department of Commerce, with providing research and technical services to the other agencies leading to more effective use of computers within the Government. As a result, a Center for Computer Sciences and Technology was established in the National Bureau of Standards, the nucleus of which were the organizational units that had developed from the pioneering activities undertaken in the mid-1940's, among whose accomplishments were the design and development of the first fully automatic internally sequenced digital computer put in operation in 1950 and the contractual procurement of the first commercial computer known as the UNIVAC I's. It is of interest of note that the first of the three computers delivered under this contract was utilized for processing 1950 census data.

Since information is basic to providing technical and advisory services, one of the five divisions of the Center for Computer Sciences and Technology was given the responsibility for organizing and managing a specialized information center for the computer sciences and technology and related disciplines. The Office of Computer Information, as this division is now known, began its task of identifying, acquiring as necessary, organizing and providing technical advisory services from its data base of computer information. In the five years of its existence it has developed the largest file of computer information known to exist and has provided services not only to the Federal

Computer community but also to businesses, industry, academia, and state and local governments.

The obvious key to providing such services is identification of and providing access to computer information for user assimilation and utilization. Media conveying computer information vary from the usual handwritten, typed and printed documents to punched cards, punched paper tape, magnetic tape, flowcharts, programs, pictures, drawings, specifications, microforms, companies and people. Specifying the information content involves descriptive cataloging by means of descriptive data elements unambiguously defined and uniformly applied. This infers the utilization of a well delineated classification scheme and content analysis through assignment of keywords and descriptors as a minimum. It involves delineating means for exchanging or providing access to segments of descriptions of information sources, since the volume precludes a single center from maintaining all information or doing the entire task of analysis, storage, retrieval and dissemination. It infers agreement on a universal set of data elements and their codes for descriptive cataloging and a common format for inscribing them on magnetic tape for further processing and for effecting information exchange among information centers.

The Office of Computer Information (OCI) has made substantial progress in all of these areas. In cooperation with several Government agencies and various professional society members of the American Federation of Information Processing Societies (AFIPS), an interim classification scheme for computer information has been developed utilizing the many previous schemes as the base. The portion relating to computer programming and computer programs has been extended in depth, cooperatively with the U.S. Patent Office and the American Patent Law Society as a result of the decision that some computer programs are patentable.

A so-called universal set of descriptive data elements was evolved from the work of a collaborative group known as the Joint Agreements Group (JAG), representing OCI and such technical societies as the Association for Computing Machinery, the American Society for Information Science, the Computer Society of the Institute of Electronics and Electrical Engineers, the American Institute of Physics, the American Psychological Society and the Applied Linguistics Society, as well as several Government Agencies. At the same time under the sponsorship of the American National Standards Institute (ANSI), its Z39 Committee on Library Work, Documentation and Related Publishing Practices, with members from industry, government, academia and the library sector, notably the Library of Congress, drafted the specifications for a standard format for bibliographic interchange via magnetic tape which was approved as an American standard. The draft was recently used as the basis for an international standard for consideration by the International Standards Organization (ISO).

In order to provide for immediate tools as well as long-range plans, OCI designed and is implementing a computer-based information processing system whose title proclaims its universality and its acronym is indicative of its primary purpose. Entitled Computer- and Human Aided Organization of a Information Center, its acronym CHAOTIC hopefully indicates that a chaos of

information can be systematically organized through the capabilities of computers and people working together to provide responsive and responsible information services. The magnetic tape files contain descriptive data that include the appropriate data elements selected from the universal set for each source document and information item, encoded and recorded in the standard format.

Currently, the file is recorded and processed for two purposes: first, to create a set of computer-produced indexes to the file, such as author, corporate author, Key Word in Context (KWIC), Key Word Out of Title (KWOT), subject, report number, and bibliographic listing; and secondly, to provide a master file available for either batch processing of queries or on-line remote access search and retrieval by the user at a terminal. To date, the indexes have proved reasonably adequate and inexpensive search tools. When the costs of direct access by the user permit, and they will as competition in providing text searching systems increases and the price of computer time per query decreases, the file will be ready to convert to whatever system is selected. Meanwhile, OCI responds to queries for advisory information on the many aspects of computer sciences and technology that originate from all segments of society, some even from abroad.

The International Federation for Information Processing (IFIP), which is a federation of national information processing federations and societies-AFIPS is the U.S. member, sponsors a special interest group known as the IFIP Administrative Data Processing Group (IAG) which among its many activities publishes a monthly journal announcing new literature in automation. OCI also collaborates with IAG through membership in the Group and through participation in its editorial task of selecting appropriate input and providing their citations. One of the most important efforts upcoming is the very sensitive one of critical evaluation of information so that only the most useful are selected from the flood of literature and other data, sometimes referred to as information pollution.

There are many other relationships with complementing activities that should be mentioned here but it would take more time and space than are available. In brief, the many tape services that have developed both under professional society sponsorship and by commercial enterprise as well as by Governments provide an excellent source of information for augmenting a data base when they are in a compatible form and format. For example, the bibliographic information on the Federally sponsored report literature that the National Technical Information Service (formerly U.S. Clearinghouse for Federal scientific and Technical Information) is one source of such augmentation. The tapes provided by INSPEC on Computers and Control are a second source. Such inputs can minimize substantially the input function for a specialized information center which along with content analysis is the most costly.

In summary, it is already evident that the integrated combination of computers and communication can and will have an important effect upon the fundamental structure of society. Computer systems and networks should be optimized for people efficiency. For example, some practical systems may be developed in which communications could be effectively substituted for transportation in densely populated areas, and computer-controlled communications could greatly

Improve the process of dissemination and retrieval of information. One such improvement already under consideration by some large professional societies is personalized publication. Total information systems and their utilization have been referred to as one of the most important new frontiers of human creativity. Communications facilities are the life blood of these systems.

The accomplishment of these goals can be materially aided by the provision of timely information on the computer and information sciences. After all, a man' s judgment is no better than his information.

T C 4

COMPUTER AIDED DESIGN AND MANUFACTURING ELIMINATING ENGINEERS' ROUTINE TASKS

by Gwendolyn G. Hays

Biography.

Mrs. Gwendolyn G. Hays graduated in Electrical Engineering at the University of Pittsburgh in 1964. From 1964 to 1967 she was at the Department of Defense, Ft. Meade, Maryland, as Programmer-Analyst and wrote programs for CDC-1604, PDP-4-CRT Display, SDS-9l0 and IBM-7094 in Fortran 63, Midas, Symbol, and Algol, Cobol and Snobol respectively.

Since 1967 she is Programmer- Analyst at the Aerospace Division, Baltimore, of the Westinghouse Electric Corporation for the development on a Univac 1108 in Fortran IV of a Computer Aided Design package which included digital logic simulation, assignment *of* printed circuit cards and documentation drawings utilising the Gerber drafting machine.

Publications; Computer-Aided design: Simulation of Digital Design Logic, IEEE Transactions on Computers, Volume C-l', Number 1, January, 1969, pp. 1-10.

Chairman *of* Requirements and Developments *of* Aerospace Computers panel at Computer Designer's Conference and Exhibition.

Patent disclosures: Digital Logic Simulation, Oct. 1969, AA69-309. Digital Logic Documentation Schematics, Dec. 1969, AA69-364. Computer-Aided String List Generation, April 1970, AA70-l05.

Married to Frank W. Hays, Senior Engineer at Westinghouse El. Corp.

SUMMARY

A logic design automation system has been developed to aid engineers in the design and production of digital equipment. The purpose *of* this system is to relieve the engineer *of* many *of* the routine tasks associated with logic design and free him for more creative and productive work.

There are five sections to this particular design automation system, with one or more computer programs available in each section to perform the operations indicated. Although the sections form a coherent package and were intended to be used as such, it is possible to use them independently. .

The- Five sections *of* the system are: simulation, layout, manufacturing, documentation and testing.

The paper is oriented to the user and does not cover the software of the related computer programs. This paper shows the amount of effort requires *of* the design engineer to use the system and the corresponding results which are produced by the system. Benefits such as cost reduction, accuracy, repeatability, etc., will be discussed.

COMPUTER AIDED DESIGN AND MANUFACTURING: ELIMINATING ENGINEERS' ROUTINE TASKS

by Gwendolyn G. Hays

In the past when an engineer was given the task of providing a customer with a given piece of hardware the engineer created the design on paper, purchased the necessary hardware, and then "followed" it through the manufacturing stage. The engineer was required to manually generate such items as component counts, assignment information and wiring lists, and transpose the location information onto the engineering sketches. The amount *of* time actually spent in the creative part of the design cycle was a small fraction of the total. With the increased use of computers, this deplorable condition is being eliminated. Many of the routine tasks can be performed by the computer leaving the engineer free to design another system or improve the present one.

This paper is intended to acquaint the reader with a group *of* computer programs which is now a fixed part of the design/manufacturing phase. The normal sequence of use of the programs is for simulation, assignment, wiring, drafting, and testing. But each of the programs can be used separately by coding input for the individual programs. Normally the coded input flows through the entire package with information being added along the way as needed. Figure 1 shows the main parts of the digital system. The system's aid starts at the point when the engineer has the design or a meaningful partial design on paper. First the design is verified for completeness and accuracy by checking the generated timing diagrams. Next the design is assigned physical components and a wiring tabulation is prepared. This information is then processed to produce wiring commands for either a termi-point machine or a wire wrap machine. The original diagram plus the assignment information is drawn as documentation schematics. Testing procedures are also produced and both the schematics and test procedures are used for system checkout and delivery to the customer.

Figure 2 shows a circuit which will be followed through the total package. This figure is a sample and not intended to reflect any merit *of* its own. The design, shown in Figure 2, can be totally simulated by coding one description *for* each element in the system. To code this circuit the following is necessary. The element in the upper lett-hand corner is *of* element type NAND, thus NAND is placed on a coding form.

TYPE	INPUTS	OUTPUT
NAND		

The element inputs are BIT1 am CARRYO-; thus they are added to the *form.*

TIPE		INPUTS	OUTPUT
NAND	BIT1	CARRYO-	

The output of the gate is SUM1-; thus the output signal is added in the output column am the element is totally represented. All other gates would be coded in a similar manner.

TYPE		INPUTS	OUTPUT
NAND	BIT1	CARRYO	SUM1

The flip-flops would be coded as follows. The type is denoted as JKFF.

TYPE	INPUTS	OUTPUT
JKFF		

The five inputs consist of J, K, clock, DC set, and DC reset lines in that order.

TYPE		INPUTS				OUTPUT
JKFF	SUM1	SUM1-	CEAR-CP	DCSET	DCRESET	

The output and output complement are also added to the coding form.

TYPE			INPUTS			OUTPUT	OUTPUT COMPLEMENT
JKFF	SUM1	SUM1-	CEAR-CP	DCSET	DCRESET	BIT 10	BIT 10-

This description of the design is run through the simulation and the input (circuit description) is verified for further use in the package. The outputs of the simulation program are various cross references, accounting statistics, propagation times, loading statistics, etc., and timing diagrams. The sample shown in Figure 3 is a typical timing diagram.

This output allows the engineer to verify this design without hours of tedious hand calculations. One either waits until the system is fabricated and then uses an oscilloscope with only a few traces with which to check the design or uses the computer program which acts as a large multitrace oscilloscope. It is also much easier to change the design by adding or removing a few punched cards than by finding room in the backpanel to try the proposed" fix" and then adding physical wires.

Once the engineer has checked the system to a completeness which is feasible for the size and time frame allowed (all possible combinations and permutations may be impossible), this design description is used throughout the rest of the design/manufacturing phases.

Satisfied that the design is correct, the engineer now decides what hardware is to be used to fabricate this design. The engineer may choose existing printed circuit cards or planer arrays, or design special purpose printed circuit cards. Whatever the choice, a description of the hardware building blocks is now added to the input data for the computer aided design package. For example, let us assume the engineer chooses a set of existing printed circuit cards, a sample of which might be Figure 4. The description of each unique card to be used would be coded in the following manner.

The element in the upper left-hand corner is a flip-flop. Therefore a JKFF is placed on a coding f*orm.*

TYPE	INPUTS	OUTPUTS
JKFF		

The element input pins are J = 19, K = 17, clock = 18, DC set = 31 and DC reset = 27; thus they are added to the form.

TYPE				INPUTS		OUTPUTS	
	J	K	C	DCS	DCR	OUTPUT	COMPLEMENT OUTPUT
JKFF	19	17	18	31	27		

The output pins of the flip-flop are 29 and 28; thus the outputs pins are added to the output and complement output respectively and the element is totally represented.

TYPE				INPUTS		OUTPUTS	
	J	K	C	DCS	DCR	OUTPUT	COMPLEMENT OUTPUT
JKFF	19	17	18	31	27	29	28

The next computer program in this package takes the original logic description plus this newly coded information and maps the logic onto the various available printed circuit cards. The engineer can input the arrangement of these cards in the backpanel or the computer, via another program, will place them in the backpanel for minimum wire length. All this done, the resulting output is a string list. This list consists of signal name vs. row, connector, and pin of the backpanel and is shown in Figure 5.

In parallel, this information is used by the drafting program and the wiring program. We will discuss the wiring part first but bear in mind that the products, wired backpanel and finished drawing, are completed simultaneously.

More information is again added to the input data. This information describes the physical geometries of the backpanel. A sample bankpanel is shown in Figure 6. The geometries are necessary for the automatic wiring machine to know the location of the pins for wiring.

The wiring program takes the string list information and creates a from-to-list in an order which minimizes wire length within each signal string. This from-to wiring list is converted into commands which control an automatic wiring machine. Figure 6 is a sample of an automatically wire-wrapped panel. The wires in this case are wrapped around the pins or posts. Another machine can clip the wire to the post if stranded wire is desired.

By the time this wired panel is back to the engineer (either from the company's shop or an outside vendor) the finished and correct schematics of the design that the panel represents are also ready.

These schematics are a result of a computer program which took as an input the original system description (Figure 2) and the string list information (Figure 5) generated by the assignment program. The drafting program breaks the design up into frames. Each frame contains a clocked

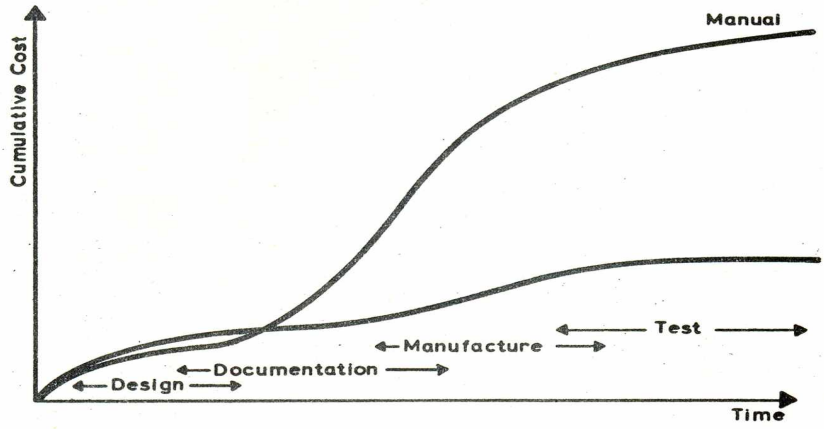
element and its feeding logic. These frames are then arranged on whatever size drawings the engineer desires, and the final drawings photo reduced for use in manuals.

The computer program "draws" (generates command to control the plotters) these frames in compliance with United States Military Standard 806B on either a flat bed photo head (light exposes film) plotter or on a cylinder ink pen plotter. Fig.7 is a composite drawing from the photo head flat bed plotter.

This phase of the computer aided package required no extra input or effort from the engineer. The engineer can control the arrangement of frames if desired, but it is not necessary.

Now that the design is implemented, testing becomes an important item. However, due to having simulated the system, the computer mows the correct timing diagram for the function the design is to perform. By exercising another phase of the simulation program the computer generates fault signatures for the design. These signatures are the bit patterns which will occur at the measurable outputs if some component has malfunctioned. A sample output is shown in Figure 8. By punching these signatures on a tape to be used by an automatic tester or by printing a table for the test engineer to use, the computer program has produced a form of' test specification document. Of course, the computer verifies and insures that the input stimulus exercises the circuit completely. Any faults are noted which cannot be detected or isolated due to lack of test points or outputs.

The engineer now has the hardware, completed faster, more accurately, and best of all at much less cost. Figure 9 shows dramatically how much was saved on an actual contract by using the whole package from beginning to end.



In summary, a comparison of the old am new methods should show the benefits the engineer has derived from using the CADCAM package. Consider what the engineer has to do now vs. what was done prior to computer aided design. We note the word "aided" as an important first clue. These programs are meant to help the engineer and although each can operate automatically, often the engineer will follow the data and add manual overrides. For example, in order to get minimum wire length in a backpanel, the computer might scatter the various flip-flops of a register on various printed circuit cards in the backpanel. In order for the engineer to work with the design, however, it may be desirable for all these flip-flops to be together in the backpanel. The designer would therefore locate the register with manual inputs to the computer program. Experience has shown these manual overrides are usually minimal.

What the Computer Aided Design package does for the engineer is eliminate the hours of manual writing and figuring that used to be necessary. The designer now has a quick and accurate tool to aid in creating a piece of hardware. No longer does the engineer generate timing diagrams by hand. The computer can do a much larger quantity, more accurately and much faster. The most beneficial result is that the designer can try several ideas for the design and finally choose the best one. This is not feasible if a person is generating the timing diagrams.

Another feature is that the very time consuming and repetitive task of sectioning the design, allocating those sections to the various available printed circuit cards, and generating the string list information is minimized. Not only did this phase create a time and logistic problem but seldom, if ever, was it redone to improve wire length. Generating the wiring order within strings was difficult but redoing each string several times was impossible.

After all this row, connector and pin information was generated, it still had to be copied onto the engineer's sketches. Human errors were inevitable somewhere in this whole task.

It is a common experience of having the design fabricated and ready for testing when the drawings are weeks from being ready. Those old sketches are fairly out of date by the time the engineer is expected to generate specifications to test the system. Then even when the drawings do come, they have to be checked! This package helps generate the results when they are most needed.

Evaluations have shown that this package eliminates the routine paper work and tedious hours that the engineer used to expend in order to create the desired design. The result is the time needed for creating a better design all the way around. Better from the standpoint of accuracy, time, and most of all cost!

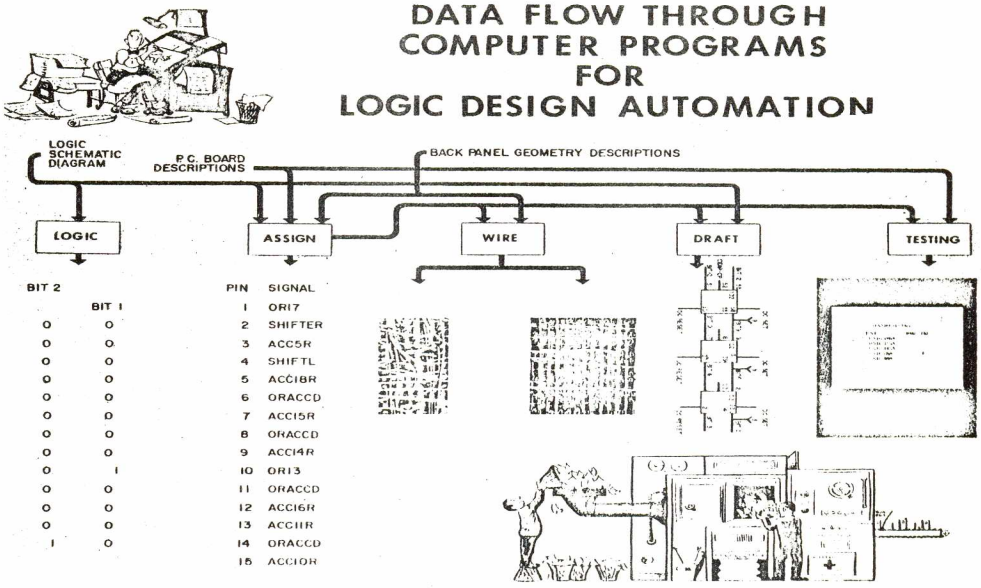


Figure 1. Overall Flow

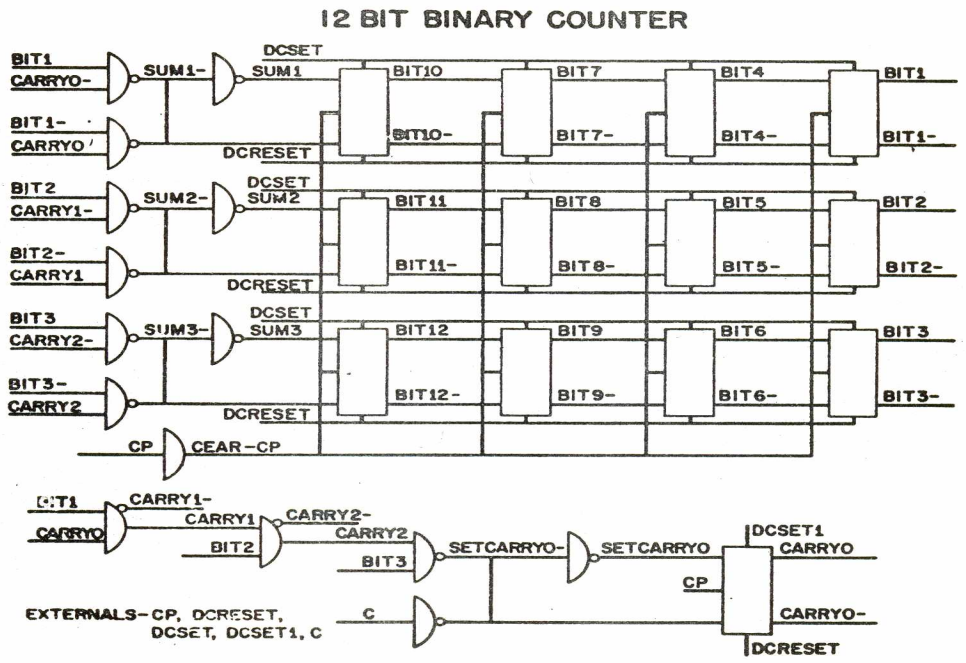


Figure 2. Sample Circuit

CLOCK	OUTPUT	C	CARRY0	CARRY2		SUM2		
				CARRY1		SUM1		SUM3
0	0	0	0	0	0	0	0	0
1	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0
3	0	1	0	0	0	0	0	0
4	1	0	1	0	0	1	0	0
5	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0
7	0	1	0	0	0	0	0	0
8	1	0	1	1	0	0	1	0
9	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0

Figure 3. Timing Diagram

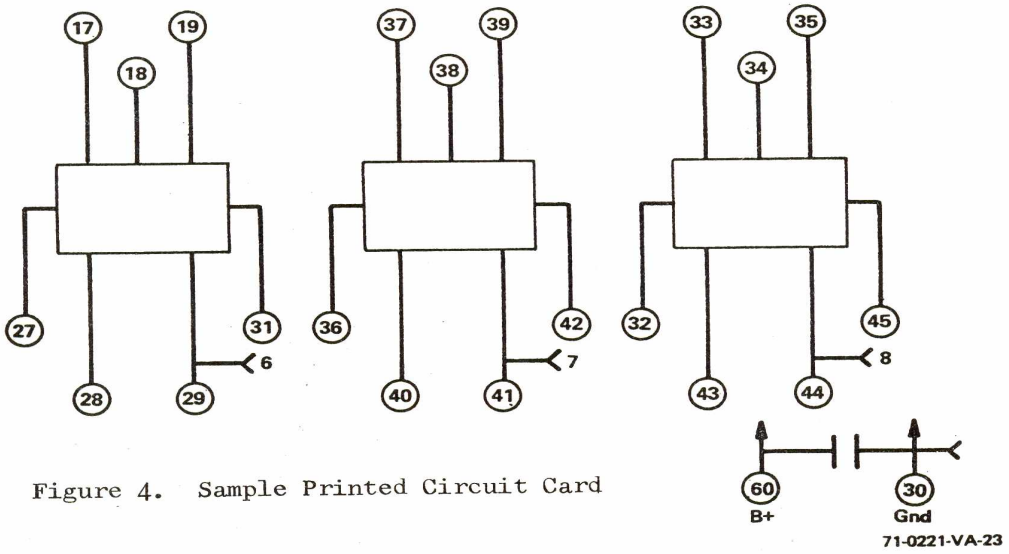


Figure 4. Sample Printed Circuit Card

BIT1–	101	1
CARRY0	101	2
BIT1	101	3
CARRY0–	101	4
BIT10–	101	5
BIT10	101	6
DCSET	101	7
BIT2–	101	8
CARRY1	101	9

Figure 5. Sample Output-String List

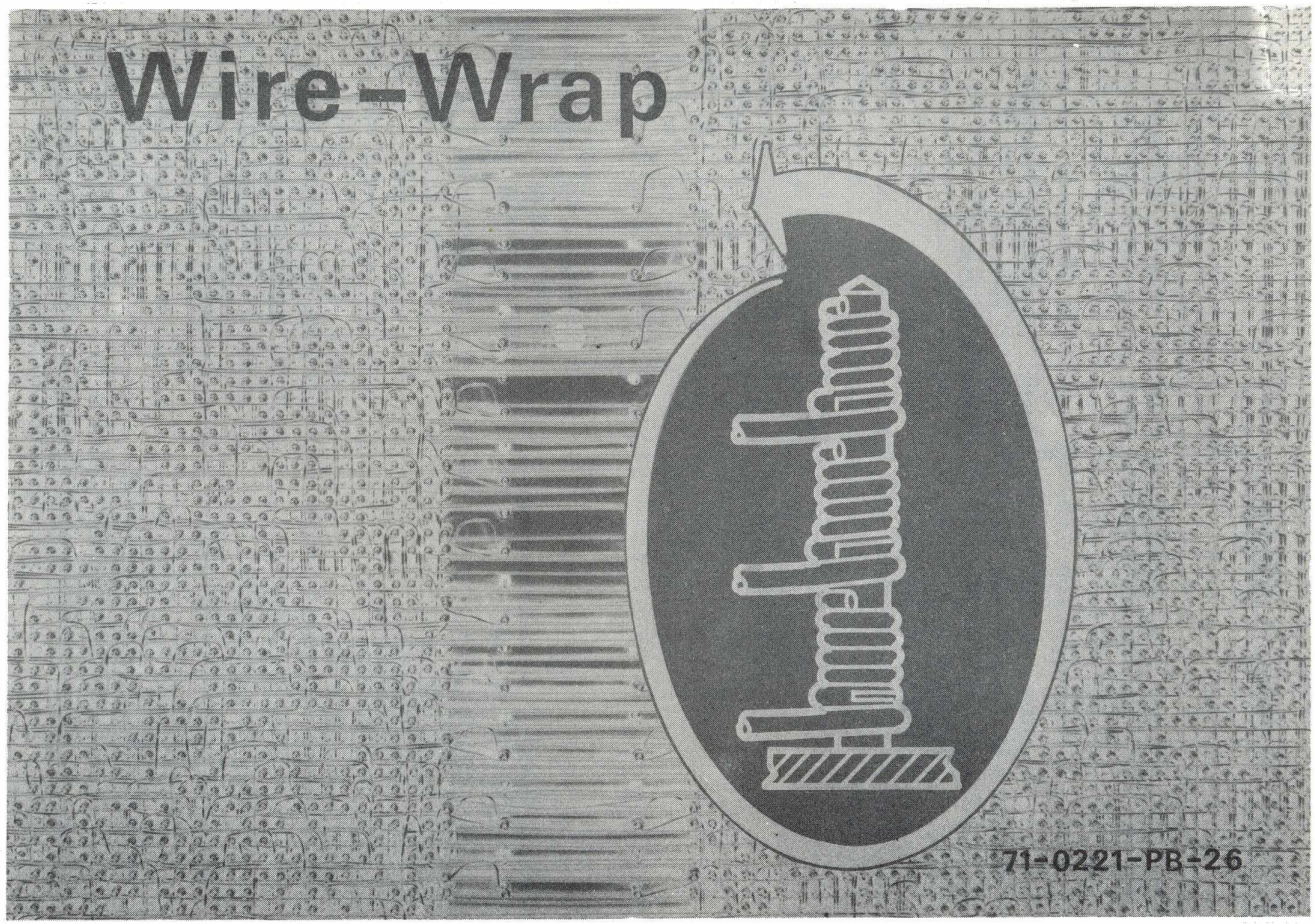


Figure 6

Figure 7. Gerber Composite

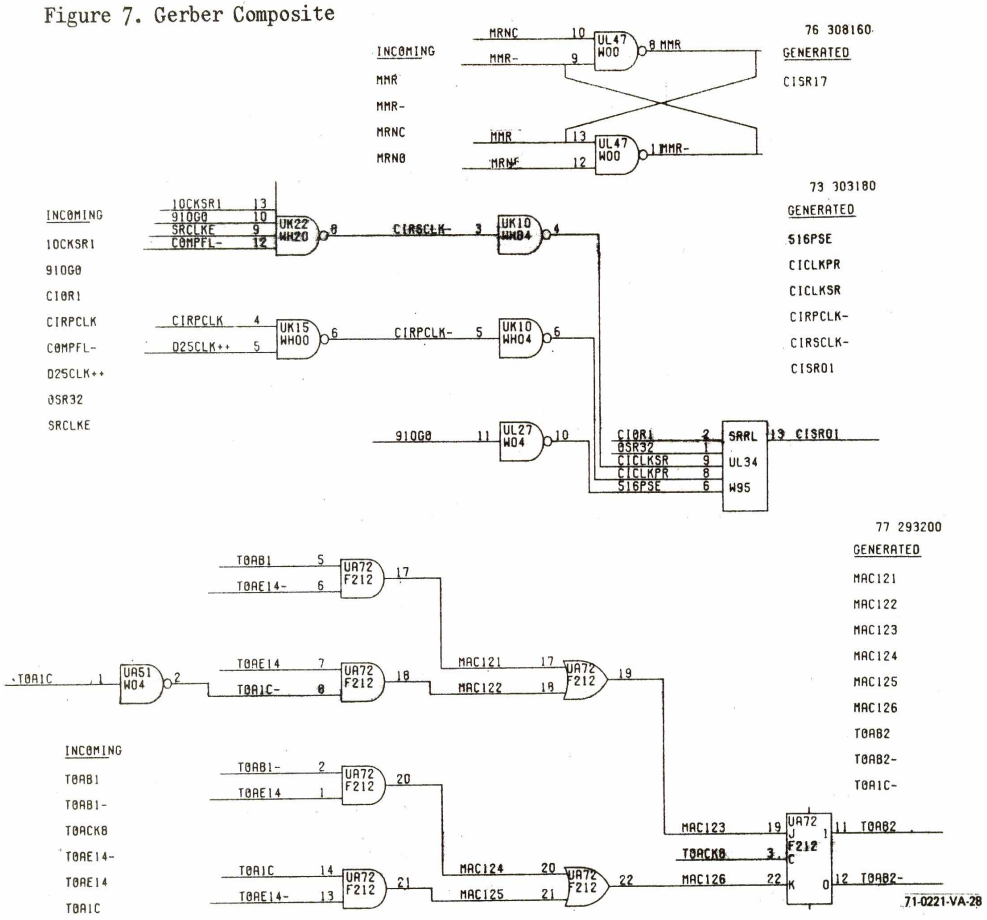


Figure 8. Fault Signature

```
TEST     0
TEST     0 STIM/RESPNS 1111000000 0100010001 1000110
                       26 INITIAL FAULT DETECTIONS
 F/SIG 19NA    1000711 ---------- ---------- -------
 F/SIG 17NA    1000911 ---------- ---------- -------
 F/SIG 18NA    2000811
 F/SIG 16NA    2001010
 F/SIG 14NA    1001211 ---------- ---------- -------
 F/SIG 7NA     1001911 ---------- ----------E -------
 F/SIG 5NA     2002111
 F/SIG 2NA     2002410
 F/SIG 1NA     2002510
 F/SIG 4NA     1002221 ---------- ---------- -------
 F/SIG 22JK    2000111 ---------- ---------- ---E---
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T D 1

HOUSING: IMAGE OF OUR SOCIAL PROGRESS

by Arq. Estefania Chavez de Ortega

Biography

Mrs. Chavez de Ortega earned in 1954 the professional Degree in Architecture at the School of Architecture (ENA), National Autonomous University of Mexico, Mexico City, and is currently working to get her graduate degree (M.A.) in Urban and Regional Planning. She is University Professor since 1959 in the same school, teaching several subjects in City Planning, Urban. Economy, Urban Sociology, History of Cities, Theory of City Planning, Urban Design and Urban Design Workshop.

She has carried out various administrative jobs in the Urban Seminary at the ENA, professional jobs in urban planning for some cities in Mexico. She is currently advisor in Urban Planning for the Governments of the States of Tabasco & Guanajuato, Mexico. Together with her husband, Arq. Carlos Ortega Viramontes, she has also worked on housing projects in Mexico City, Tuxtepec, Oaxaca and others.

Member of the scientific team working at CoNaCIT (National Council for Science and Technology) in environmental pollution problems, she has given various lectures in cities and universities both in Mexico and in the U.S.A. participating in scientific, cultural and international conferences and lectures in Mexico, U.S.A. and Europe.

She belongs to various national and foreign scientific and cultural societies, among others is currently the President of the Mexican Society for Planning.

Summary

The urban problems are symptoms, phenomena that reveal a confusion of the functions in the socio-cultural, economic and political structures of the communities that suffer them; the awareness of this will allow us to streamline and formulate the necessary policies, suitable to act on the new relationships in such a manner to avoid the countless conflicts originated by circumstances referred to.

HOUSING: IMAGE OF OUR SOCIAL PROGRESS

by Arq. Estefania Chavez de Ortega

The present situation of housing has been considered only through the evident fact of its scarcity and it is thought that this scarcity is fatally inevitable in every urban community. This observation has led to view the serious problem of housing as a problem isolated from the other socio-economic, political, cultural elements that make up the whole society. Both explanations give us a hint of the real complexity of the phenomenon but prevent us from a clearer and more precise analysis.

In order to establish the present situation of habitable structures, both from the point of view of their quantitative existence as well as of the qualities they have to meet it is necessary to initiate their analysis from the present characteristics and requirements of the economic and socio-cultural development of the country.

The organisation of production within the contemporary business and industrial economy and the ensuing growth of the free enterprise have given birth to a radical change in the social structures and particularly in the concepts of habitability of urban housing. Creation of new housing areas, enlargement and remodeling of those already existing, and which are the result of a constant process of development, modify not only the outside appearance of our communities but also change complex values, behavior patterns and social relationships, because of the development, and these, when accelerated as in the case of our Latin American countries, lead to derangement. Thus the communities acquire dimensions that change them radically.

These modification are a constant in all societies and the multiple examples created by the growth processes compel us to try to learn exhaustively their complex manifestations. Undoubtedly, an appropriate analysis must realize that the present situation of housing is a sign of the deep changes brought about by the process of urbanization; that is to say a symptom: urban problems are symptoms, phenomena that reveal a confusion of the functions in the socio-cultural, economic and political structures of the communities that suffer them. The awareness of this will permit to streamline and formulate the necessary policies, suitable to bring on the new social relationship a bearing that may avoid the countless conflicts originated by the circumstances just referred to.

Not long ago it was considered as a matter of fact that if housing, on the one hand, contributed to the well being of humans, it did not have any part as a development factor, nor was it a patrimony of most of the people. In our societies human needs have an order of solution, and as long as the most immediate ones are not met, housing will remain in a secondary place as a consequence of the economic and cultural- differences present in our society.

The accelerated process of urbanisation we are going through, the transition from a rural society into an urban one, originates a great development of cities in Latin America; this urbanisation process, this urban "inclusion", emanates from the demographic "explosion", the prolonged life expectancy, due to certain scientific discoveries and, above all, from the migration from the country to the city. The urbanisation generating forces cannot be stopped

Or reversed, but it is possible, and this has to be done, to give them a better direction in a positive way in order to attain a reasonable distribution of population.

The constant migration of rural population to urban areas causes an alarming derangement at the national level as far as the distribution of their inhabitants is concerned. In the cities themselves this disorderly concentration and the resulting congestion equally generate problems as those of environmental pollution, constant and costly changes in the use of land, unjustified oscillation in real estate price levels. E.g.: the necessity of covering long distances to the place of work or to school in many countries is already surpassing the limits of tolerance. The environmental changes due to the fact that vast extensions of land are arbitrarily invaded by paved surfaces; the demand for new services generates , at times, air and noise pollution, soil erosion and modifications in the use of land. At first glance, the inhabitants themselves do not clearly realize the true magnitude of the problems that an unorganized concentration triggers.

Regarding the other derangement causes, consisting in the distribution of population under excessive dispersion and low income bracket, we would only point out the economic impossibility of providing all necessary services (utilities): water, light and power, communications, sewers, schools, shopping facilities, and so forth.

The best proof can be found in the constant existence of very poor dwellings that can only be considered shelters but not housing; and to change these shelters into homes, which become a positive development factor, many qualities are required to achieve a real change in the dweller toward a genuine desire of improvement, instead of a gradual debasement to which living in a "cave" inexorably leads.

So, beyond any reasonable doubt, the necessity of planning housing policies must be a constant task of every government, since these policies in the first place affect people of low and middle income status. Defining a housing policy implies getting acquainted with the multiple factors involved and, at the same time, considering the real possibilities in order to determine just how far we can get; at the same time it means avoiding isolated solutions that regularly benefit and are useful to a minority only, or are carried out at the expenses of other low income groups.

Undoubtedly, the general planning is to include administrative, technical research, financial, demographic, cultural, institutional and other aspects, and through all these considerations it has to establish the necessary means to use intensively and in a rational manner, labor and social investments, simultaneously promoting among other things productive enterprises and establishments. It is also essential to consider the building costs that cannot be covered because of the low income levels in some population sectors.

The high demand for building materials and equipment cannot be satisfied for lack of means of production and, on the other hand, to this we should add regulations that are not being enforced or have become unenforceable, as regards the existing possession of land, speculation with urban real estate and the negative attitude of some social layers toward the development demands.

The great need to meet these requirements cannot be questioned. Nevertheless, in the particular case of countries like Mexico, there is an aspect that calls for immediate attention and that involves professional and educational factors oriented toward improving the present condition of housing. The need for a reorientation and educational improvement is aiming at making maximum use of our available resources, adapted to our real necessities.

Technical assistance is necessary in order to undertake research concerned with the environmental economic and social functions as well as to specifically prepare professional men and to increase the number, diversity and quality of our specialists at the necessary levels. *All* this is extremely important in fields related to the civic orientation needed to give the required technical assistance and publicize it properly in order to start this far-reaching plan. The educational reorientation must not only include the instructional aspects, properly speaking, but also make all population sectors aware of the necessity of a greater participation in social work.

Our efforts on the whole, are directed toward establishing an educational structure that would include differents forms of motivation intended to make the inhabitants think about the urgency of inducing widespread participation in schools, at home and in community life, indispensable to achieve harmonious development; this educational structure, well oriented, requires a minimal cost compared to the benefits it represents.

The creation of these necessities originates the awareness that we and no one else are to be the ones who choose, with the necessary knowledge, our more elevated ways of life. It is possible that we are, actually, at the key point in our development, but we do not know that all this growth must be maintained with a more conscious participation of our responsibilities. Toward this point it is where the mobilization of the social forces has to be channeled and these forces will lead to reach the proclaimed aims.

It is crystal clear, as far as housing is concerned, that there is a possibility of professional women's active participation in contributing to this very important change, because the intention is to strengthen the creation of new and better perspectives of life. In this participation also housewives and mothers should join, since they should - and are able to - spread out the knowledge of necessary requirements and technical solutions.

We are aware of the work that has been done in various countries concerning plans for community development as well as in the systems of self-help and mutual aid; but it is necessary that these areas be a part of an integral planning scheme so that their success may constitute a joint action. The educational reform appears in its full magnitude precisely here, at this point.

The need of development not only points to capital growth. The decisive step is a real change of minds, from the traditional to modern concepts that include the basic aspects of contemporary teaching all over the, world. But the solutions must be conceived in harmony with each country's ways of life: the insistence upon this essential idea must be the base of education.

S A 5

WOMEN OF TURKEY TODAY

by Bilge Ozgdner

Biography

The author has graduated as Insaat Yuksek Muhendisi which is equal to a master degree in civil engineering from the Technical University of Istanbul (ITU, TMMOB).

As an assistant of the Faculty of Civil Engineering she did a postgraduate work on "The effect of earthquakes on high structures". She spent a year working with Professor Bizeno on Photo Elasticity in Delft-Holland. Now she is a lecturer at the Technical University of Istanbul. She is teaching Engineering Mechanics and Strength of Materials.

Summary

The paper gives a short historical review of the place of women in Turkish Society. Some statistics are given, comparing educational standards of men and women. It shows that the fight for women's rights is not enough, what should be done against the old traditions, which kept the girls at home for centuries. The first step is to fight for a 100% literate country.

WOMEN OF TURKEY TODAY

by Bilge Ozguner

It is not the problem of aptitudes but of traditions. The unique personality of modern Turkish women is greatly influenced by the fact that they are associated with a very ancient world. So to understand today and our aptitudes we have to review the past.

The origin of our fathers was Middle Asia. Because of the change of climate they moved on in search for better places; west Asia, Europe, near East, Anatolia were the new settlement areas. All through these the women had to be very ingenious to adapt themselves to the new environment, keep house in tents, fight if must and look after the live-stock.

Rights and responsibilities were shared. The women represented together with the men the tribal integrity and authority. It is a pity we have very few written documents about this period. According to written documents Anatolian history begins at the 2nd millenium B.C. We know by ancient tablets that at that time women enjoyed a very good social position. Turkish women did not hide behind veils, they were in constant company of men.

Just one historical example: After a long battle between the Hitite Empire and Egypt a peace treaty was made (Kadesh) 1294 B.C. The document (a silver tablet) was undersigned by the King and the Queen, Pudu-Hepa of Hitites, but on the other side the Queen of Egypt seems to have had no such right. The women of the Turkish tribes always had the right to own property and the free use of it.

With Islamic faith started the degradation of women. During the Ottoman Empire (1299-1923), Turkish women under an unjustified religious bigotry lost their equality and superiority. It is a fact that this bigotry impairing women's rights of equality has its origins in the Orient. During this period, marriage, bringing up of children and inheritances were regulated by Islamic Law which favoured men. Except in a small number of families, women had very little opportunity for education. It was customary to rear the girls at home. But even at that time the law recognized full freedom to women on matters pertaining to property right and entitled them to own independent property with complete freedom in managing.

Till nearly the end of the XVIIIth century an education was really a luxury even for men. An elementary education which consisted of reading- writing and reading the Kuran were considered enough by most.

First the Military felt the need for special technical education. Engineering schools for the Navy, and then for the Army were opened in 1773 (this is considered the foundation of our Technical University of Istanbul). The Medical School was established in 1826. Even at that time only girls in great towns went to school between the ages of six-ten.

The first movement to regain social and educational rights for women started right after the Ottoman Reformation Bill was declared. Secondary schools for girls were opened. The first one was established in Istanbul in 1858. Later in 1869, schools of handicrafts for girls and in 1870 training schools for women teachers were opened.

Through the efforts of the intellectual women and men of the period, one of the prophet Mohammed's sayings, "it is an obligation for all Moslems, men and women, to seek for knowledge", was used for silencing the protests of fanatical and narrow minded men. In the meantime, periodicals for women started. These published articles by female writers that defended educational, social, civic and economic rights of women.

The period of Constitutional Monarchy in Turkish history (1908) witnessed a great social movement in favour of liberty, equality, education of women and monogamy. In 1913 high-schools for girls were opened in Istanbul, no other till 1922 (Izmir and Ankara), and girls were admitted to conservatories and commercial schools. For the first time in 1915, girls enrolled at the University but only to special classes for girls. This was permitted for the teaching members of the gir1s' schools. October 1917 brought a new step forward. Women were allowed to enroll in the Medical School and to practice medicine. In 1918, co-education at the University of Istanbul was accepted.

As men went to the battle front during the First World War, women had to take some of men's places. They were employed at the post offices, Treasury offices, hospitals, small business enterprises. Even so their activities were on a small scale.

The War of Independence (1918-1920) was the life and death struggle of the nation. During this war women played a great role. The townswomen looked after the wounded, produced food for the troops and went to work in the offices more and more. The country women carried ammunition up to the front on ox-wagons. When necessary they even wore arms as valiantly as their husbands or sons.

Ataturk, our great national leader says: "We cannot conceive of the women of any other nation being superior to the hardworking Anatolian woman. It was our Women who upheld our nation's power to survive during the Independence War and during previous wars. It was the Anatolian women, ever sublime, self sacrificing and divine, who tilled the earth, sowed the seed, cut and fetched wood from the forest, carried ammunition to the front while nursing her baby in her bosom, without heed for rain or drought." No other leader has been able to give as extensively and strongly the credit and esteem to Women's Rights, as the great statesman Ataturk who appreciated the value and position of Turkish women. After the Declaration of the Republic in 1923, he began to make his very first reforms in the field of Women's Rights.

Ataturk prepared the ground for Women's Rights first by infusing this idea to the people, by his public addresses. At that time, intellectual Turkish women

were of great help to him. The Civil Code was adopted from the "Swiss Civil Code" in 1926. This granted women monogamous marriages, equality of both sexes in divorce, inheritance and guardianship of their children. (Civil marriage became obligatory and religious marriage lost its legal value).

The Municipal Law of 1930 relating to elections, conferred the rights on women of voting and being elected as Mayors. In the coming years Ataturk, in a series of addresses, heralded and explained the merit of women taking part in the political destiny of the state. In 1934 women acquired the right of voting and being elected for Parliament. That year for the first time 18 women deputies entered the Parliament.

Today there are Turkish Career women in all vocations, such as members of Supreme Court, the Council of State and the Court Accounts, jet pilots, doctors, teachers, engineers, university professors, lawyers, judges, etc. and at last we have our first Minister in the new cabinet. (Minister of health and welfare ... Prof. Doctor Turkan Akyol).

To evaluate the position today let us look at some statistic. Starting by the first year of Turkish Republic 1923-1924.

Sum of Schools		Teachers:	Students:	Graduates
5062	Male	9526	280,908	517
	Female	1298	64,614	8

The number of schools were distributed as such:

Elementary	4894
Secondary	72
Lycees	23
Training Schools for teachers	20
Handicraft Schools for boys and girls	14
Commercial Secondary Schools	1
Schools for religious education	29
Universities and equivalent schools Of higher education	9

That was the base we started with!
The first census was taken in 1927:

From	13,648,270		literate	illiterate	
male	6,563,829	%48.1	852,000	4,036,000	%82.5
female	7,084,391	%51.9	260,000	5,354,000	%92.2

In 1927,		male	female
Elementary School teachers:	15,718	11,153	4,505
In 1935, illiterate:		%70.3	%89 .9
in 1965"		%43.7	%74.0

In 1928 Ataturk forbid the use of the Arabic letters and the, Latin letters used by all the Western World was accepted as turkish alphabet with a few minor changes.

It is very interesting to compare this increase of literacy between city' and country folk, over the age of seven.

		1927	1935	1950
city	literate	597,000	1,102,000	2,360,000
	illiterate	1,268,000	1,232,000	1,565,000
country	literate	514,000	1,415,000	3,410,000
	illiterate	8,122,000	8,618,000	9,331,000

Literate people in towns were %32 of the population in 1927, doubled itself in 23 years by 1950 it was %60 of the population. In countryside the increase is much more, from %6 to %26.8 (four times).

It will be useful to give some data relating to the 1965 general population census, to enlighten the subject. (The detailed result of 1970 census is not known yet).

1. The Turkish population was 31,391,421. 15,996,964 men, 15,394,457 women.
2. From this 20,585,604 live in villages and 10,805,817 live in cities.
3. During the period from 1960 to 1965 the population recorded an increase of 2.6%.
4. 26,464,040 of the total population were born in villages, districts and administrative centers of the provinces in which they were living. Thus 4,927,381 persons had changed their places of residence.
5. Of 25,664,797 people who were six years old and over, the number of those who could not read and write were 13,138,956 and of these 8,450,391 were females and 4,688,565 were males.

So 48% of the population over the age of six is literate, 52% is illiterate.

From 12,378,000 literate persons, 7,500,000 graduated from a school and 4,800,000 learned to read and write outside of normal schools. (Special classes for grown ups and at doing their military service). From 7,500,000, 61% are male and 59% are female. From 4,800,000, 39% are male and 41% are female. It shows that more women went to special classes then men! So the old traditions still prevail, not all the families in Turkey are sending their girls to school But women have a lot of aptitudes for learning. Therefore, whenever they find a chance they make up for it. .

The table in the following page shows the percentage of male and female schools' graduates of the literate population of Turkey in 1965 over the age of eleven.

School Degrees	Male	%	Female	%	Total	%
No School	2,048,000	29	863,000	26	2,911,000	28
.Elementary School	4,046,000	57	2,043,000	63	6.089,000	58
High School	493,000	7	204,000	6.2	697.000	6;6
Lycee	210,000	3	78,000	2	288,000	2.7
Technical or Professional School	190,000	2	78,000	2	268,000	2.6
University or equal higher education	141;000	1,9	26,000	0.8	167,000	1.6
others	4,000	0,1	1,000	0.0	5,000	0.5
Total	7,132,000	100,00	3,293,000	100,00	10,425,000	100.00

From the table we see that 68% of the literate population (over the age of eleven) consists of males, and 32% consists of females. Unfortunately most of the women give up further study after elementary school!

A very interesting result is that the percentage of girls who wants to learn a profession equals that of the boys. (2%) Therefore, the girls will have the opportunity to study as much as the boys do, not worse.

I do not want to wear you out with a lot of statistics. So we will just see the results. As I wrote in "The Women Engineer", Volume 10, No.6, Autumn 1967, the first woman civil engineer graduated from Istanbul Technical University (yuksek muhendis okulu) in 1934. The first mechanical engineer in 1939, and then, a year later as the first woman electrical engineer who did radio engineering as post graduate work and became the first woman radio engineer of the world. In 1942 the first woman architectural engineer graduated with a Master's degree. We have about a thousand registered women engineers and architects today.

But the need for engineers is great in Turkey. The table below was taken from the second five years plan book, page 171, table 81 of the Governmental Planning Department of Turkey (T.C.D.P.T.).

The unbalanced need of Engineers (1968 - 1982)

(1000)	1967	1968	1969	1970	1971	1972	1977	1982
Engineers	8.6	10.3	11.3	12.9	14.1	16.2	31.2	55.8
Architects and Civil Eng.	4.4	5.4	6.0	6.7	7.4	8.6	17.1	30.5
Mechanical Engineers	2.7	3.1	3.6	4.1	4.5	5.5	9.0	14.9
Electrical Engineers	0.9	1.0	1.0	1.2	1.5	1.3	2.5	4.5
Mining Engineers	0.5	0.6	0.6	0.7	0.7	0.9	1.6	2.8
Other Engineers	-	-	-	-	-	-	0.3	1.6
Topographer, Hydrogr. etc.	0.1	0.2	0.2	0.2	0.3	0.4	0.8	1.5

In 1968 we had 5257 registered civil engineers and 3121 registered architects. 5257 + 3121 = 8378. We needed 5400 more ! This means that we could scarcely fulfill 60% of our need.

The latest statistics shows that :

The Technical University of Instanbu1

Branch of University	Last Year Graduates 1969-1970			Sum of Students 1969-1970		
	female	male	sum	female	male	sum
Civil	3	112	115	25	1025	1050
Architecture	3	51	54	59	478	537
Mechanical	1	90	91	3	1039	1042
Electrical	2	49	51	33	775	808
Mining	3	37	40	6	589	595
Chemistry	7	21	28	67	361	428
Sum	19	360	379	193	4267	4460

The Technical College of I.T.U.

(Engineering and Architectural Univ.)

Branch of University	Last Year Graduates 1969-1970			Sum of Students 1969-1970		
	female	male	sum	female	male	sum
civil	-	23	23	9	513	522
Architectural	7	26	33	63	237	300
Mechanical	-	65	65	3	505	508
Electrical	1	22	23	4	258	262
Mining	1	22	23	12	197	209
Chemistry	1	31	32	43	185	228
Sum	10	189	199	134	1895	2029

"

(The Foreign Students excluded)

So if we take the result of the statistics, women are only about 5% of the Student Body of the Technical University of Istanbul. This is very poor. As there are 16 lady professors and 45 lecturers and assistants at the Tec. Univ. of Istanbul. This is about the 20% of the whole staff.

Our observations can be summed up in a few sentences.
We have no wage discrimination.
There is little or no resistance from employers or employees.
There are no special problems for the women engineers of Turkey.
The problem is to get enough girls into the universities and educate them.
For this, we must fight with the old traditions and with the belief that women's place is their house. But to do this first we must have a 100% literate country.

My belief is, that not only the government, but also the women's organizations should take an active role in this fight.

As "Turkish University Women Association" (IFUW) and as "Union of Soroptimist Club of Turkey" we are trying to do our duty. Year after year, more and more literacy classes and vocational education courses are opened and financed by these and other women's organizations in Turkey.

The Turkish Union of Soroptimist Clubs, with the help of their European Federation and UNESCO, are building a "School Workshop and Community Center" in Istanbul's suburb. Only after such labourer communities, the small towns people and the villagers will get educated, the pressures of the old traditions, together with the negative influence of the patriarchal system will diminish. Only after that can we draw more girls to technical fields and to scientific studies.

IN CANADA, MUST ENGINEERS BE MEN?

by M. Dormer Ellis, B.A.Sc., B.A., Ed.D., P.Eng., M.I.E.E.E., M.E.I.C. Department of Adult Education
The Ontario Institute for Studies in Education, Canada

Dr. Dormer Ellis has University of Toronto degrees in engineering physics, social sciences and education. She is a registered professional engineer (electrical) and a certificated teacher of secondary and post-secondary mathematics and science. She has worked as an engineer in England and in Canada and has taught electrical technology at a polytechnical institute.. Since 1962, Dr. Ellis has been conducting research and giving graduate courses at the Ontario Institute for Studies in Education; statistical analysis and research methodology are her major interest areas. She is the author of many research reports and technical articles in English and in French.

Summary

The publication last year of the report of the Royal Commission on the Status of Women in Canada focussed public attention on the virtual exclusion of women from many areas of Canadian life-the penury of women professional engineers being a notable example. Against a background of the findings of the Commission, the present paper discusses the social customs, popular beliefs and subtle pressures which have led inevitably to the present scarcity of Canadian women in the scientific and technical fields Current efforts of the Canadian government to reduce sex discrimination in employment practices and educational programmes of the provincial governments intended to raise the career aspirations of Canadian girls are described. Emphasis is on attempts to attract girls into the scientific and technical professions.

IN CANADA, MUST ENGINEERS BE MEN?

by

Dormer Ellis

In Canada there are many scientists and also many professional engineers. However, there are very few women scientists and a woman professional engineer is indeed a rare creature.

In order to practise as a professional engineer in Canada, a person must be licensed by the Association of Professional Engineers of one of the ten provinces. In the province of Ontario, which includes one of the most important industrial regions of the country, there are twenty-five thousand professional engineers, only forty of whom are women. In all of Canada, with its population of twenty million people, there are only a hundred women who are licensed to practise the profession of engineering.

A graduate student in sociology recently completed a thesis based on an intensive study of this small group of women.[1]. The subjects of the research were very co-operative in giving information about their professional and personal histories and aspirations. Data were collected by means of questionnaires and interviews. Among the findings of this study is the fact that only about a third of Canada's women engineers were born and educated in that country. The others immigrated to Canada after having become qualified as professional engineers in their homeland in most cases, countries in eastern Europe. These immigrant women engineers told the researcher of their surprise when they first realized that, in their chosen country, engineering is an almost exclusively male profession. , The new Canadian-born women engineers described to the researcher the prejudices and obstacles that they had overcome in order to enter the profession of their choice.

Why is it that so very few Canadian girls prepare for a career in , engineering? There is no law in Canada which prohibits or even restricts the tree entrance of women into any occupation. The provincial licensing bodies of the engineering profession have never discriminated against female applicants. The requirements of graduation from the engineering faculty of a recognized university plus a couple of years of appropriate employment in industry are identical for both sexes. Do Canadian universities dissuade girls from enrolling in engineering courses or even refuse to admit them as students? At one time, some of them did., But that time is long past. Nowadays, there are no restrictive clauses

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[1]Mrs. G. Goodlings, Master's thesis in sociology, University of Waterloo, Ontario, Canada, 1971.

against female students in the admission criteria for university courses in engineering. Nevertheless, some engineering courses have no co-eds at all, and many others still have only a very small minority. Engineering courses are just an extreme example of the preponderance of male students in university courses requiring mathematical skill and knowledge of scientific principles. Is the public school system the source of the sex differences in the mathematical, scientific and technical interests of young Canadians? One looks in vain for overt sex-discrimination in the educational system. Both elementary and secondary education are free. Attendance at school is obligatory for all children up to the age of sixteen years. Boys and girls attend the same schools, are taught in the same classrooms by the same teachers, and ,~ite the same examinations. Throughout their first eight, years of schooling, boys and girls follow the same curriculum. In the higher grades, there is considerable choice of subjects. Unlike the practice in some countries, Canadian students are not assigned to a programme of studies on the basis of their previous academic achievement or schlolastic aptitude scores. The choice of secondary school programme is made by the student and his or her parents. But boys and girls are not equally likely to choose subjects that are essential for future scientists, mathematicians and professional engineers.

What factors influence the student's choice of secondary school programme and subsequent career? Which is more influential-the student's aptitudes or the customs and traditions of society? It is the author's contention that the Canadian girl does not decide against preparing for a career in engineering the possibility of doing so is unlikely to even occur to her, her parents or her teachers. Few Canadians would try to explain why engineering is an almost exclusively masculine profession; both men and women just take it for granted that this is a natural reflection of innate sex differences. in attitudes and interests.

Large-scale academic aptitude and school achievement testing projects have failed to uncover sex differences anywhere near large enough to account for the sex differences in subject choices of secondary school and university students. For example, comparisons of marks earned in Grade 8 mathematics and science provide no justification for the great difference in the proportions of boys and girls who continue to study these subjects long enough to obtain the admission requirements for university courses in engineering. It is apparent that subject choices are largely the result of future role expectations. Greater care is exercised in the selection of an appropriate secondary and post-secondary programme for a son than for a daughter. The boy expects to have to earn his own living and that of his dependents throughout his adulthood. The girl is looking for a short course of training that will lead to an interim occupation until she begins her real adult life as wife and mother. There is a widely accepted belief

in Canada that women are in the labour force only briefly and that it is therefore unnecessary and even foolish for a girl to devote years and years of study towards a profession that she will either never pracitse or will practise for only a short time. School guidance counsellors have accepted without question the decisions of countless Canadian girls to take courses in typing and office practice. Girls of above-average ability and ambition were given information about the professions of nursing and elementary-school teaching which require only a year of professional training after secondary school. The few Canadian women who have qualified in the learned professions of 1aw,.medicine, dentistry and engineering have had to overcome the subtle but persistent pressure of society to limit their aspirations to those deemed appropriate for a woman.

For several decades, government statistics concerning the participation of Canadian women in the economic life of the country have demonstrated the falsehood of the socially-accepted myth about the average woman working for only a few years before marrying and then living happi1y ever after as. a contented housewife and mother. However, it is only since the estab1ishinent by the government in 1967 of the Royal Commission on the Status of Women in Canada[2] that public attention has been focussed on the disparity between the myth and the reality. The Terms of Reference instructed the Commission to "inquire into the status of women in Canada and to ensure for women equal opportunities with men in all aspects of Canadian society". The seven Commissioners[3] were asked to study the present and potential role of women in the Canadian Labour force, including the special problems of married women in employment, and to recommend measures that the government could take to permit the better use of the skills and education of women, including the special re-training requirements of married women who wish to re-enter professional or skilled employment.

A brochure, "What Do You Have to Say About the Status of Women?" was distributed across the country in supermarkets and libraries and through associations and the mass media. The Commission received 468 briefs and about a thousand letters of opinion. Many of these submissions entailed a great deal of research on the part of those who presented them. Pubic hearings were held in fourteen cities and in many smaller centres. All the hearings were scheduled so that they would be held at times and p1aces convenient for women and an atmosphere of informality and easy exchange was maintained. Some 890 witnesses appeared before the Commission. In several cities a "hot-line" telephone service was set up so that people unable to come to the hearings could talk direatly to a Commissioner. The

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[2]Report of the Royal Commission on the Status of Women in Canada, Information Canada, Ottawa, 1970. Pp 488.

[3]one of the Commissioners was Miss Elsie Gregory MaaG111, an engineer

Commission sat for 178 days over and above 37 days of public hearings. As the Commission moved across the country, its activities became front-page news in city after city. In newspaper editorials, in magazine articles, on radio and on television, the discussion and debate about what is and What should be the status of women in Canadian society continued month after month. Statistical reports that previously had only gathered dust suddenly became of general interest. Facts began to supplant the myth about working women. Previously, evidence that was contrary to the myth was treated as ‘ the exception that proves the rule'. But the report of the Royal Commission on the Status of Women in Canada made common knowledge of certain disquieting facts:

> “ In Canada, some two and one-half million women are working for pay. They represent roughly one-third of the labour force and one-third of the female Population old enough to work.

The participation of women in paid employment is well established. The number of women who never return to paid employment once they have left to raise a family is becoming proportionately smaller. More and more married women enter the labour force intermittently between the births of their children and permently when their youngest child has entered school.

Of a11 women in the labour force, 55 per cent are married. The more education a wife has ,the more likely she is to stay in the labour force or return to it early.

Women generally work in a few occupations labeled ' female', earn less money than men and rarely reach the top. This has been the situation for so long the society takes it for granted. Seeing Women in lowerpaying jobs and men in senie ones leads management to think in these terms when jobs are open, and so the system perpetuates itself.

Occupational. segregation by sex, generally long-standing has led to occupations and professions commonly being referred to as 'traditionally female' (such as secretary, typist and telephone operator) or 'traditionally male'. Professions such as engineer and architect ,are generally considered to be traditionally male.”

Among the recommendations of the Royal Commission on the Status of Women are several intended to raise the career aspirations of Canadian girls. It is pointed out that there are two critical times of decision in the educational life of a girl. One is the transition from elementary to secondary school, when she chooses the course she will take. The other is at the completion of secondary school when she decides whether to go to university to prepare for a profession, to enroll in a business course, or to take a job. The Commission urged "all those involved in the education of girls to emphasize the long-term effects of choices made during high school. years and to impress on girls the importance of education for women."

Although it is only a few months since the publication of the report of

the Royal Commission on the Status of Women in Canada, it has already had considerable effect both on governmental regulations and on public attitudes. Canada Manpower, which is a government agency intended to serve both employers seeking suitable employees and members of the public seeking suitable employment, no longer, announces on the radio that "The following jobs are available for men. . . . .. and the following jobs are available for women. . . ." as had previously been the custom. Now employment opportunities are stated without any reference to the sex of, the prospective, employee. Also, the "Help Wanted" columns of newspapers are now forbidden by law from advertising jobs as being intended for one or the other sex. Educational authorities are examining textbooks used in the schools to try to find ‘Ways in which women can be shown in roles other than , that of housewife or office worker. School guidance counsellors now have at their disposal a series of booklets entitled "You're a what?", each of 'Which is the true account, of a young Canadian woman who is happy and successful in an unconventional occupation —for example , a professional engineer!

The engineering profession itself is beginning to consider seriously the opportunities for women members. The magazine Engineering Careers in Canada Which is Published annually by the Engineering Institute of Canada for the information of secondary school seniors and university undergraduates includes a discussion of the suitability of many women for careers in engineering .It says, "Canada is the loser when it does not train more women engineers and many bright young ladies are missing an opportunity for a fascinating career by not becoming engineers". Woman engineers and engineering students are being invited to speak at engineering society meetings and to suggest ways in which more girls can be encouraged to prepare for work in the field of engineering.

It seems unlikely that on the occasion of the Fourth International Conference of Women Engineers and Scientists, I will be able, to inform you that Canadian women comprise fifty per cent of the engineering profession, but it is highly probable that I will be able to report a very substantial increase in the number of Canadian girls who are opting for careers as professional engineers.

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S C O

ROLE SOCIAL DE LA FEMME INGENIEUR VU PAR L' OPEN DOOR INTERNATIONAL

par M.me Lucie Guillerault-Danel

Biographie

L'Auteur est diplomée de l'Ecole Centrale des Arts et Manufactures et également de l'Ecole libre des Sciences Politiques.

E1le s'est occupée d'abord du préchauffage de l'air avant son admission dans les chaudiéres à 1a Société Française Babcock & Wilcok. Puis elle a été secrétaire du Conseil d'Administration de la Société des ACIERS FINS DE L'EST sous la présidence de Monsieur Louis Renault. Requise civile en 1940 aux ATELIERS et ARMEMENTS de RUEIL, section des chars d'assaut.

Actuellement retraitée, elle s'occupe des questions intéressant particuliérement les travailleuses et leur promotion.

Madame Lucie Guillexault-Danel est Chevalier du Mérite Social et a été récemment nommée Secrétaire Générale de l'Union Professionnelle Féminine(Business Women), et membre de la Société des Poétes Français.

Résumé

Le role social des ingénieures présente deux volets:

a) I'un concerne Ie role qu'elies doivent jouer vis à vis de l'ensemble des ingénieures, role d'autant plus important que 1es femmes ne représentent encore qu'une faible minorité dans la profession;

b) l'autre concerne celui qu'elles doivent jouer vis a vis de I'ensemble des travailleuses et tout d'abord de celles qui travai1lent sous ses ordres

ROLE SOCIAL DE LA FEMME INGENIEUR VU PAR L' OPEN DOOR INTERNATIONAL

par M.me Lucie Guillerault-Danel

Les idées ici exprimées rejoignent celles pour lesquelles milite depuis longtemps l'Open Door International, association destinée à la défense des droits de la femme qui travaille. Cette association réclame pour la femme Ie même acces à la profession, la même formation, les même rétributions et la me même promotion. Elle mea déléguee parmi vous pour vous entretenir du role social qui doit étre, selon elle, celui des femmes de votre profession.

Comment, direz-vous, vous réclamez mêmes droits, mêmes responsabilités, même role pour les hommes et pour les femmes? et vous voulez nous entretenir d'un rôle particulier dévolu à la femme dans cette profession? A cela je pourrais ajouter moi-même, pourquoi des associations féministes d'ingénieurs? pourquoi des Congrés comme celui auquel nous assistons aujourd'hui?

J'espére bien,en effet, que nos enfants, nos petits enfants, voire nos arriére-petits enfants n'auront plus besoin de Cercles féminins d'ingénieurs et nos Congrés n'auront plus de raison d'être dans un avenir meilleur, ou alors auront complétement changé de nature, mais cet avenir il nousappartient de Ie préparer.

Or les femmes n'ont eu dans Ie monde du travail des postes de responsabi lité technique que depuis peu de temps, relativement. La premiére école d'io génieurs ouverte aux femmes en Europe Ie fut à Moscou par l'illustre Borodin en 1855, c'est à dire il y a un peu plus d'un siècle. Mais la plupart des pays n'ont de femmes diplomées ingénieurs que depuis Ie vingtiémé siécle et certains mêmes depuis quelques décennies.

Les femmes ont dû s'inserer dans une société qui a été organisée préala blement par l'homne pourl'homme et elles ont dû s'y créef une place, vaille que vaille, en dépit des traditions et des préjugés. Il n'est donc pas sur prenant que certaines d'entre elles aient rencontré des échecs ou des demiechecs. Bien sur, quelques unes, dont vous êtes la plus part , ont su courageusement vaincre les obstacles, mais il leur reste un devoir, celui d'aider leurs conseurs malchanceuses et surtout de prévenir les risques d'échecs pour celles qui aborderont la carriére. Or ces difficultés spéciales d'lnsertion n'existent pas pour les hommes qui ne les éprouvent pas et ne sty intéressent pas.

Il faut donc que ce soit les femmes elles mêmes qui sty attaquent et trouvent les solutions; l'union faisant la force, voici justifiés nos cercles féminins d'ingenieurs et l'existence d'un Congrés tel que celui-ci.

Si l'on étudie de prés la nature des échecs ou des demi-échecs de nos ingénieure , c'est à dire l'abandon pur et simple de la carriére, ou les emplois d'appoint à temps partiel, nous trouvons, non pas comme cause unique, mais comme cause principale, le conflit existant entre la vie familiale dans sa conception ancienne et traditionnelle et la vie professionnelle avec ses impératifs de présence.

Or ceci, bien evidemment, n'est pas un probléme concernant les seules ingénieures, mais bien toutes les femmes qui travaillent. Le probléme est d'autant plus aigu même qu'il *s*'agit d'une travailleuse moins qualifiée, dans la nécessité abso1ue de gagner 1a vie familiale. C'est pourquoi notre devoir à nous,qui sommes plus instruites, est de nous intéresser à l'ensemble des travai1leuses, qu'il s'agisse de nos conseurs, de personnel féminin sous nos ordres, ou de toutes les autres travailleuses.

Certains ont pense de résoudre les conflits entre les devoirs du foyer et les devoirs professionnelsau détriment de ce dernier, en augmentant et quelque fois, hélas, par des lois, la protection maternelle. Le résultat a été funeste aux travailleuses surtout dans Ie secteur privé: on y accepte de moins en moins de confier des responsabi1ités a celles qui à tout moment peuvent se trouver dans Ie cas d'obtenir des congés de maternité.

Dons les petites entreprises on forme même des jeunes gens à tenir des emp10is exerces habituellement par des femmes, de façon de remp1acer peu à peu dans un grand nombre de postes les femmes par des hornmes. La petite entre prise en effet supporte de plus eu plus mal l'absenteisme féminine On a voulu aussi instaurer Ie travail à temps partiel, ce qui aboutit également à émpecher l'accés aux vraies responsabilités,aux postes de commande.

C'est à nous, à nous seules qu'il appartient de réagir en introduisant peu à peu une meilleure conception de 1a société plus pure et dans cette société,de 1a répartition des tâches.

Les ingénieurs, masculins ou féminins, ont déjé beaucoup fait pour lémancipation de la travailleuse, qu'ils en aientconscience ou non, en simplificant les tâches domestiques du foyer: machines à laver le linge ou à repasser, à domicile ou en self-service, machines à laver la vaisselle, chauffage central ou chauffage distribué, suppression des corvées de raccomoaage par baissement du prix du neuf, concentration des achats dans les supermarkets, etc. etc., et ce n'est pas fini. Chaque jour de nouvelles applications de la technique libérent la femme de lourdes tâches.

Mais jusqu'à présent les ingénieurs ne se sont attaqués qu'aux tâches domestiques et se sont peu souciés des tâches familiales, de leur simplification et de l'aide indispensable à donner à la mére de famille dans l'éducation des tous jeunes enfants. Ils ont laissé ces problémes aux mains des médecins, des sociologues, des éducateurs; or ce sont la des problemés de premiére importance auxquels les ingénieurs eux-mêmes doivent participer et particulierement les femmes ingénieurs.

I1 ne s'agit pas en effet dans Ie monde du travail technique de n'aban donner à la femme dans cette carriére qu'un travail d'appoint, lui laissant Ie temps d'être la mére de famille traditionnelle et cela parce qu'elle est nantie d'un mari pour gagner la vie du ménage. Cela ne résoudrait que Ie cas de quelques privilégiées et parfois au détriment de celles qui sont chef de famille et sont par consequent les plus intéressantes.

Dans 1a société nouvelle vers laquelle nous devons tendre et qui sera construite à la fois par les hommes et par les femmes, pour les hommes et pour les femmes, la femme devra etre professionnellement aussi disponible que l'homme.

Ce n'est pas une utopie. Cela sera d'autant plus facile qu'on aura su à temps créer les centres nécessaires à la toute petite enfance et que dans un avenir que l'on commence à entrevoir, la durée journaliére du travail sera pour tous, hommes et femmes, beaucoup plus limitée qu'à present et rendra les deux parents plus disponibles vis à vis de leurs devoirs envers leurs enfants.

N'oublions pas, en effet, qu' à notre époque Ie jeune enfant souffre beau coup plus de la carence paternelle que de 1a carence maternelle et trop de nos jeunes enfants sont élevés uniquement par des femmes, soit à la maison, où Ie pére rentre trop tard et ne s'occupe pas d'eux, soit à l'ecole où de plus en plus les enseignants se récrutent dans 1es milieux uniquement féminins.

Notre devoir social est donc d'aider à l'amélioration de la société future avec une meilleure répartition des tâches paternel1es et maternelles, une meilleure conception de leurs rôles, 1a préservation d'une indispensable education familiale avec tres tôt, Ie plus tot possible, Ie bénéfice en supplément d'une éducation collective venant compléter sans les entraver les responsabilités des parents.

Dans cet avenir il y aurait alors une véritable égalité de chances entre les travailleurs des deux sexes. Nous demandons pour cela toutes les reformes qui améioreront avant tout Ie sort de la plus intéressante de toutes les travailleuses: celIe qui doit travail1er à plein temps, ayant des responsabilités de chef de famille et dont les capacités ne demandent qu’à être développées et doivent 'être, puisqu'elle a besoin de sa promotion.

L'Open Door International Compte sur vous toutes. Je vous remercie.

S C 8

THE ROLE AND PROGRESS OF THAI WOMEN ENGINEERS

by Mrs. Phulporn Saengbangpla

Biography

Mrs. Saengbangpla graduated with a B.S.Eng. in Mechanical Engineering in 1961 from Chulalongkorn University, Thailand. She was then employed as an assistant lecturer in the Mechanical Engineering Department. In 1964 she went to France and did some research work concerning "Fuel Injection System" at the Institut Français du Pétrole. In 1965, she took some more research work on "Heat Release and Fuel Injection in Internal Combustion Engine" leading to a M.Sc. Degree in 1968 at the University of Manchester, Institute of Science and Technology. She next worked as a research assistant at UMIST until 1969, then she came back to Thailand and worked as a senior lecturer at the Mechanical Engineering Department, Chulalongkorn University, Bangkok. The subjects she is responsible for are: Thermodynamics, Heat engines, and Internal Combustion Engines.

Verbal communication

I am supposed to give you a paper on the progress and role of Thai women engineers but I have not written the paper. The trouble is when I got home last year, after I was abroad six and a half year working and studying, I tried to make a survey of our women engineers.

In 1964 in Thailand we had only eleven women engineers, all of the country, I am myself N. 9. when I went home after six and a half year we had a hundred women engineers, so the number increased ten times. This encouraged me to make a survey sending out questionnaires, but only 17 came back of a hundred. So I have not had enough details to elaborate some statistics and to really summarize the roles of these Thai women engineers. As a contribution to this sociological session I can just give you a general view of their situation.

Thailand is an agricultural country, however more and more industries are being expanded and developed. To help in this development engineers are very essential. In Thailand today there are about six thousand engineers registered at the Society of Engineers. Women are about a hundred, that is to say only 2%. I am sure this figure will go up very rapidly. Only recently, in

1950 women were admitted as regular students in Chulalongkorn University, which was the only Engineering University at that time.

The first three women engineers proved as efficient as their men counterpart and engineering community has accepted them as professionally equal. At present one of them is a Professor in the University; she is a civil engineer and the second one is the Secretary to the Director of the Telecommunications of Thailand and a third one is the head of the design and planning department of the Thai Metropolitan Electricity Authority. So for the rest of the women engineers who are playing an important role in the expansion of the technical and scientific fields. They are working side by side with men in the development of the country.

The role of women in Thailand is quite different from other countries. The Thai women, in addition to their roles in the family, they all work side by side with their husband, no matter if she has a degree or not; before women get married they will help their parents, whatever their profession is.

It has been traditionalised for a long time so, and women in Thailand are always accustomed to have equal opportunity as men do. Even if they want to work in the technological or scientific field. Also due to shortage of man power in these fields, women are always given equal opportunities in employment.

Even though women came only recently into the field of engineering, their talent in their work has made engineering communities very happy to accept them. This encourages more and more women to take up this profession. There are those who are employed as lecturers, teachers, designers and research workers, both in Government and other establishments.

S C 10

LA PARTICIPATION DE LA FEMME ARCHITECTE AU DEVELOPPEMENT DE LA COMMUNAUTE RURALE

par Arch. Valeria Prieto

Biographie

Madame Valeria Prieto, diplomée Architecte avec mention honorable de l'Université Nationale de Mexico D.F., est Professeur à l'Ecole d'Archftecture de l'Université Nationale et Assesseur Technique auprés du Ministére des Travaux Publics en qualité de Directeuz' du "Programme de Travaux de Bénéfice Social" qui a pour but Ie développernent des petites conununautés rurales.

Madame Valeria Prieto a été déléguee avec Madame Edith Nunez Tovar Ing.à représenter Ie Ministeré des Travaux Publics du Mexico à la Troisiéme Conférence Internationale des Femmes Ingénieurs et Scientifiques.

Communication

La situation des fenm;es architectes dans le monde et leur apport au développement de la communauté représentent un aspect de grande importance dans Ie monde actuel.

La nécessité impérieuse éprouvée par la femme de se réaliser pleinernent comme individu, de façon semblable à celle que l'homme a connu jusqu'a présent, vient d'occuper une premiére place dans la conscience de toutes les femmes au monde.

Les différences qui ont séparé les activités de la femme de celles de l'homme pendant des siécles d'atavisme sont en train de disparaitre en quelques années. Maintenant la plupart des pays font participer les femmes dans les programme d'éducation générale et spécialisée, mais pourtant nous savons bien qu'il existe des emplois dans lesquels le femme professioniste est seulement acceptee dans des conditions d'infériorité par rapport à 1 'homme.

Dans notre pays, une des plus grandes conquêtes de la révolution méxicaine a été celle de permettre à la femme d'acquérir une éducation supérieure et d'exercer n'importe quelle activité ou profession, indépendemment de la condition sociale oú elle se trouve.

La Constitution Méxicaine soutient et protége les droits de la femme et la posistion qu'elle peut atteindre dans la société est seulement limitee par sa propre capacite. L, femme méxicaine doit pourtant lutter encore avec tenacite pour faire disparaitre les préjudices et les habitudes qu'une grande partie de la population a rnaintenu dans la formation familiale de la femme. Un grand nombre de péres, fiancés, époux et de fréres considérent toujourscomme un manque de qua lite de l'homme Ie fait de permettre que les fem

mes de la famille exercent une activité productive et rémunerée. Ils considérent d'autre part la fen~e comme un objet décoratif ou une machine pour produire des fils et même pas comme une compagnie dans la vie.

La femme doit cesser d'être un meuble que l'homme a pu acquérir comme possession personnelle pendant sa vie pour devenir un étre avec des droits et des aspirations propres. Un plus grand nombre de femmes qui arrivent à s'incorporer au travail dans n'importe quel domaine de la productivité, apporteront plus vite un meilleur developpement de la communauté.

La femme remplit des fonctions multiples dans la vie actuelle et de façon préminente se trouve celle d'élever et de soigner ses enfants. Ses activités seront pourtant réalisées d'une façon d'autant plus efficace que sa préparation intellectuelle sera plus vaste.

Les femmes techniques au Mexique ont un grand intéret pour préter leur collaboration technique aux classes plus faibles de la population aussi bien rurale qu'urbaine.

Le développement économique, social et culturel de la communauté rurale de notre peuple se trouve dans une étape de transformation. Le paysan méxicain ne peut plus vivre de la terre de la façon traditionnelle, comme il a fait depuis les temps préhispaniques.

La famille des paysans ne peut plus et ne doit pfus habiter dans les mêmes chaumiéres qu'il a occupées pendant des siécles. Malheureusement les pires conditions d'hygiéne physique et psychique se trouvent encore dans une grande partie des foyers paysans au Méxique. Maintenant le Gouvernement fait des projets et des ouvrages pour la régéneration et l'équipement du milieu rural qui se base sur une planification d'ordresocial. Cette planification étudiela ré construction et la rénovation sociale, morale et physique de l'ensemble des possibilités et des potentia lités humaines dans Ie but de satisfaire les ne-cessites fondamentales.

Comme vous savez, l'habitation est une expression physique, sociale et culturelle dans laquelle doivent se satisfaire plusieurs nécessités et fonctions fondamentales de l'individu et de la famille. La famille, l'habitation et le voisinage ont une influence décisive dans Ie conditionnement social et culturel de l'individu. Dans ce programme il est necessaire de s'efforcer pour réaliser 1a satisfaction des besoins familiaux et de renforcer ainsi les diverses modalites de la vie meme en commun.

Dans la "Secreta ria des Ovras Publicas" t c'est à dire Ministére desTravaux Publics nous avons l'opportunité de faire maintenant un programme de transforamation rurale qui s’appelle “programme de de travaux Bénéfice Social “Ce programme comprend les aspects suivants:
vaux Publics

- création de sources de travail dans les villages de paysans,

- construction de routes secondaires pour faire sortir les produits de ces villages,

- creation des espaces pour les sports et l'amusement de caractére rural et les relations humaines.

Pour la réalisation de ces ouvrages Ie Gouvernement apporte l'assistance technique et les matériaux industriels et les habitants du village donnent 1a main-d'oeuvre et les matériaux de la région. C'est un programme modeste, mais qui procure la transformation sociale et culturelle du méxicain moins favorise.

Conclusion finale

Dans la planification de l'aménagement et l'amélioration de l'habitation rurale on doit inclure les aspects suivants:

- chercher à obtenir une augmentation des ressources familiales en amélio rant les sources du travail ou en établissant de nouvelles sources,
- étudier en meme temps que la distribution des dépenses soit faite de fa çon plus organisee,
- aider à la création de nouvelles activités familiales pour offrir surtout une occupation productive à la femme, ce qui apporterait en plus un bénéfice sensible à l'economie familiale,
- construction et organisation fonctionnelle des centres d'approvisionnement et de commerce de genre coopérativiste où les habitants puissant obtenir des articles et des produits à bas prix,
- installation de petits centres d'artisanat et création de petits ateliers de diverses spécialités de la petite inductrie,
- création de nouveaux réseaux et unités de transport qui faciliteraient la distribution des personnes et des produits partant des centres de travail vers les centres de consommation et d'habitation,
- obtenir l'assainissement efficace des centres d'habitation en fournissant des systemes d'égout, de l'eau potable, l'éclairage électrique, l'aménagement des logis, l'élimiriation des ordures et l'utilisation de la main-d'oeuvre des habitants pour réduire les prix des travaux,
- chercher à établir des programmes d'éducation sociale ou extrascolaire, particuliérement pour la femme et les adultes; cette éducation porterait concrétement sur l'éducation sanitaire, nutritive et recréative, l'ensei gnement de l'économie domestique et les soins d'ordre prenatal et postnata.

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