IFAC International Federation of Automatic Control
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Newsletter

IFAC-Congress 1981 in Kyoto

A Memorable Event

Contents:

Editor: Prof. Dipl.-Ing. Fred Margulies
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An ancient imperial city with its treasures of old Japanese culture, a modern International Congress Hall with its most up-to-date facilities, highly efficient Japanese organisers and staff, all going out of their way to overcome the innumerable difficulties inevitably arising on such an occasion — such was the scene for the VIIIth IFAC World Congress, held in Kyoto from August 24—28, 1981.

25 years ago, in September 1956, an international gathering of a few engineers and scientists, interested in the new field of automatic control, which they considered to be of growing importance, gave birth to the idea of creating an international organisation. One year later, IFAC came into existence.

The development of automatic control over these 25 years, with respect to both theory and application, is equalled by few other areas of science and technology. The Kyoto Congress bore witness to this fact with its more than 600 papers presented in 116 technical sessions, 7 survey papers presented in plenary sessions supplemented by 17 round table discussions and 8 case studies. The outstanding facts of these presentations were the most remarkable spread of automatic control to all fields of applied technology, in particular the fast progress of robots, and the further theoretical developments. The 1500 participants from 47 countries were an interested and active audience.

IFAC's General Assembly dealt with applications for membership submitted by engineering associations of Ireland and Venezuela and admitted both countries as 41st and 42nd member organisations. The General Assembly furthermore adopted the new IFAC Constitution and By-laws with the understanding that the next General Assembly (1984) will discuss possible modifications in the light of experiences meanwhile collected before adopting the Constitution definitely.

Last not least Academician Tibor Vámos (Hungary) was elected President for 1981/84, with Prof. Manfred Thoma (FRG) President elect, Academician Boris Tamm (USSR) and W. E. Miller (USA) Vice Presidents.

Apart from papers, sessions and discussions this congress offered the unique opportunity to gather impressions of Japan, to learn about Japanese efficiency, modesty, hospitality, friendliness and helpful assistance whenever it was required, and to explore the Japanese way of life, work and leisure.

In summary: a congress memorable to IFAC and to every participant.

FORTHCOMING EVENTS

Title	Date	Place	Submission of Papers/ Abstracts	For further information please contact
IFAC Symposium on Theory and Application of Digital Control	January 5—7, 1982	New Delhi, India	not possible any more	A. K. Sinha Department of Electrical Engineering, Indian Institute of Technology, Delhi, New Delhi 110016, India
Prolamat '82 5th International Conference on Programming Research and Operations Logistics in Advanced Manufacturing Technology	May 16—18, 1982	Leningrad, USSR	not possible any more	USSR 199164 Leningrad, Mendeleyevscaya linia 1 Leningrad Research Computer Centre of the USSR Academy of Sciences PROLAMAT '82 Organizing Committee
4th IFAC Workshop on Distributed Computer Control Systems	May 24—26, 1982	Tallinn, USSR	Papers: April 19, 1982	Prof. B. Tamm DCCS-82 Tallinn Technical University Ehitajate tee 5 Tallinn 200026, Estonia USSR
6th IFAC Symposium on Identification and System Parameter Estimation	June 7—11, 1982	Washington, D.C., USA	not possible any more	The Secretary IFAC-82 Symposium c/o the Department of Electrical Engineering Systems, University of Southern California, Los Angeles, Calif. 90007, USA
IFAC Workshop on Computer Aided Design of Projects and Development Policies	June 22—24, 1982	Ankara, Turkey	Papers: March 31, 1982	Dr. Önder Yüksel Chairman of the Electrical Engineering Department Middle East Technical University, Ankara, Turkey
Industrial Robots: Chances and Problems for our Enterprises	September 28—30, 1982	Linz, Austria	Abstracts: November 1, 1981	Prof. Dr. Arno Schulz Institut für Informatik Johannes Kepler Universität A-4040 Linz, Austria
3rd IFAC/IFIP Conference on Software for Computer Control	October 5—8, 1982	Madrid, Spain	not yet known	Prof. E. A. Puente Escuela Tecnica de Ingenieros Industriales Universidad Politecnica de Madrid, Castellana 84, Madrid 6, Spain
4th IFAC/IFIP Symposium on Information Control Problems in Manufacturing Technology	October 26—28, 1982	Gaithersburg, Maryland, USA	Abstracts: January 15, 1982	M. Auman, Secretary National Organizing Committee IVth IFAC/IFIP Symposium National Bureau of Standards Building 220, Room A 123 Washington DC 20234
IFAC Symposium on Components and Instruments for Distributed Control Systems	December 9—11, 1982	Paris, France	not yet known	Dr. Z. Binder Laboratoire d'Automatique de Grenoble — ENSIEG B. P. 46, 38402 Saint-Martin-d'Hères, France
5th International Conference on Analysis and Optimization of Systems	December 14—17, 1982	Sophia Antipolis, France	not yet known	Prof. J. L. Lions, President of INRIA Domaine de Voluceau B. P. 105 F 78152, Le Chesnay, France
4th IFAC/IFIP/IFORS International Conference on Control in Transportation Systems	April 20—22, 1983	Baden-Baden, FRG	Abstracts: January 15, 1982	VDI/VDE Gesellschaft für Meß- und Regelungstechnik P. O. B. 1139, D-4000 Düsseldorf 1, FRG

Continuity and Change

by President T. Vámos

As IFAC is approaching its 25th anniversary, the 10th President in IFAC's history is taking office. Up to now nine different personalities have served IFAC as Presidents, coming from different countries, with different special interests within the broad field of automatic control and systems engineering. This variety has always been harmonized by a common devotion to our field of work and a strong faith in its importance, by a common idea of a possible and indispensable co-operation among scientists and engineers, university professors, people of technology, researchers and users all over the world, aimed at improving the quality of life for everybody. "Control Science and Technology for the Progress of Society" was the slogan of the VIIIth IFAC World Congress and should remain our target for the next period.

The backbone of this cooperation is the IFAC family, people who — independently of their temporary functions — serve our human-technical ideals by the most humanistic ties of friendship.

Under the presidency of Professor Sawaragi the last three years were an outstanding example of this friendship and cooperation, which spell success for IFAC. The more than 50 scientific events sponsored or cosponsored by IFAC, the long series of high standard IFAC publications, the consolidation of our first independent secretariat in Laxenburg, the adoption of the new Constitution — these are achievements which will remain milestones in IFAC's history — including the extremely successful Congress in Kyoto.

I consider it my foremost duty to try and preserve the legacy established 25 years ago and to which each of my nine predecessors contributed their share; to hand it on to my successors, to a long series of coming presidents in the future.

In the last 25 years, the automatic control field has seen a technical progress not parallelled in any time before. The changes in the world have been not less dramatic. It is a firm conviction of all of us that automatic control and system science have an important role in solving the problems of today and tomorrow; our craft is just proliferating in mass production and mass application, changing the nature of human work, human cooperation, human institutions. IFAC and IFAC people should be aware of this great responsibility of ours!

IFAC Council 1981/84

The IFAC General Assembly, convening on August 24, 1981 in Kyoto endorsed the slate of officers proposed by the Nominations Committee as follows:

COUNCIL		
President	T. Vámos	(H)
President-Elect	M. Thoma	(FRG)
Vice-President-Technical Board	B. Tamm	(USSR)
Vice-President-Executive Board	W. E. Miller	(USA)
Immediate Past President	Y. Sawaragi	(J)
IFAC Treasurer	M. Mansour	(CH)
Ordinary Members	K. J. Åström	(S)
	R. Chaussard	(F)
	A. MacFarlane	(GB)
	A. Niemi	(SF)
	U. Pellegrini	(I)
	K. Reinisch	(GDR)
	I. Sharkass	(ET)
IFAC Secretary	F. Margulies	(A)
TECHNICAL BOARD		
	B. Tamm	(USSR)
	H. Akashi	(J)
	O. Aven	(USSR)
	H. Kwakernaak	(NL)
	I. Lefkowitz	(USA)
EXECUTIVE BOARD		
Vice-President of Council	W. E. Miller	(USA)
Immediate Past President	Y. Sawaragi	(J)
Treasurer	M. Mansour	(CH)
Secretary	F. Margulies	(A)
Chairman Policy Committee	J. Gertler	(H)
Chairman Publications Committee	S. Kahne	(USA)
President Elect	M. Thoma	(FRG)

IIASA greets IFAC as friend and neighbour

Dr. Roger Levien, Director of the International Institute for Applied Systems Analysis brought the greetings of his organisation to IFAC: "Not only does IIASA share with IFAC a concern in understanding and controlling complex systems, we also enjoy the charm and convenience of a hometown in common, Laxenburg, Austria, and the generous hospitality of the Austrian Government. As neighbours across the Schloßplatz in Laxenburg, we extend not only our greetings, but our warmest congratulations to IFAC and its officers for controlling the Federation's trajectory over almost a century so as continually to increase IFAC's services to the scientific community and to mankind".

Reporting on the current work of IIASA, Dr. Levien explained the structure of that 17-nation non-governmental research institution concerned with the global and universal problems facing mankind. One of its central themes is planning for the necessary transition to a global system able to meet the needs of the roughly 10 billion persons who will be alive at the end of the next century on a sustainable, equitable and resilient basis. IIASA has just published the results of its examination of the transition of the global energy system, **Energy in a Finite World,** which demonstrates that "it could be done"; the energy needs of a 10 billion person globe could be met on a sustainable basis, but only at a cost and only if we begin now to prepare the transition. A similar IIASA study of the global food future is at its mid-point and studies of other global issues (industry, resources, environment, urbanization) are in the exploratory stages.

IIASA's staff of over 100 scientists is drawn from more than 20 countries and as many fields of specialization. Control scientists play a prominent role among them and among the over 300 collaborating institutions throughout the world. Thus, IIASA has strong scientific reasons to maintain close working relations with IFAC, apart from its geographical neighbourhood.

IFAC Awards Presented

John Coales — First Bearer of the Quazza Medal

Commemorating the brilliant life of Giorgio Quazza, distinguished pioneer of power system's control and one of the architects of the IFAC Community, the International Federation of Automatic Control decided to establish a medal to be given once in each congress period as the highest honour of our engineering field.

An award committee chaired by then Vice-President Tibor Vámos with Pieter Eykhoff and William Miller members advised the Executive Council of IFAC to ask President Sawaragi to present the first medal to **Prof. Emeritus of Cambridge University, John Flavell Coales,** former President of IFAC in the years 1963/1966, for his outstanding lifetime contributions to automatic control practice and theory, especially on radio direction findings and adaptive control of complex processes, for his activities on promoting education and research in automatic control and for his invaluable services in creating and leading IFAC's organizational and publication activities.

The medal was then presented by Prof. Sawaragi.

Deeply moved, John Coales responded:

Mr. President, Mr. Chairman,
Ladies and Gentlemen, comrades all

You have done me a very great honour which I deeply appreciate but cannot possibly deserve. For services to IFAC a medal cannot be earned because that service is its own reward.

When IFAC was first proposed at Heidelberg in 1956, I was reluctant to get involved but as Shakespeare says "There's a Divinity that shapes our ends, rough-hew them how we will" and so at the inaugural meeting a year later I got heavily involved indeed. How fortunate for my wife and me for we quickly found ourselves in a band of congenial friends full of faith and enthusiasm for IFAC who have been for us an inspiration for nearly a quarter century. There can have been few activities which have been a better influence for good in this troubled world than the unselfish and indeed joyous service given to IFAC by so many. As Shakespeare also says "So shines a good deed in a naughty world" and in IFAC there have been many such.

Of all who served IFAC so happily, none did so more unselfishly and enthusiastically than Giorgio Quazza. Brought up in a small textile town on the southern slopes of Monte Rosa he joined the Resistance against the Fascists and became a most experienced and intrepid mountaineer. For me, myself a keen alpinist, he became a close and devoted friend and together we scaled the highest peaks both geographical and transcendental. In 1977 he guided me to my highest mountain peak, the Punta Gniffetti of Monte Rosa some 4500 metres high and the following year we hoped we might climb the Matterhorn together. Alas, in coming over from the Val d'Aosta to join me in Zermatt, crossing the Ventina glacier after very bad weather he was lost in a crevasse.

So you see this, his likeness, will revive for me the happiest and the most poignant memories and will be my most treasured possession.

Thank you very much indeed.

Automatica Prize Paper Award

About a year ago the Automatica Editorial Board decided that the three best papers from Automatica 1978, 1979 and 1980 should be awarded a prize. The task to select these papers was assigned to a committee consisting of

Prof. P. Eykhoff	(Netherlands) Chairman
Prof. K. J. Åström	(Sweden)
Mr. D. R. Bristol	(USA)
Prof. A. J. Fossard	(France)
Prof. M. Terao	(Japan)
Prof. Y. Tsypkin	(USSR)

Though the criteria for the selection were rather straightforward, i. e.

— good application of control
— good theory, at least supported by simulation
— clear presentation

the task proved to be a very difficult one, simply because there were too many good, even excellent papers to be found in these three volumes of Automatica. Prof. Eykhoff, who reported on behalf of the committee, explained that it was therefore decided to give three honourable citations besides the prizes.

The citations were attached to the following papers:

— C. G. Källström, K. J. Åström, N. E. Thorell, J. Eriksson, L. Sten
Adaptive Autopilots for Tankers
— U. Hartmann, V. Krebs
Command and Stability Systems for Aircraft: A New Digital Adaptive Approach
— J. L. Nevins, D. E. Whitney
Assembly Research

The following papers have been rated prize-worthy, based on the facts mentioned with each paper:

● T. Söderström, L. Ljung, I. Gustavsson
A Theoretical Analysis of Recursive Identification Methods,
Automatica, vol. 14 (1978), p. 231 — 244

This paper is considered to be a really important contribution to the scientific development of recursive parameter estimation, as an essential sector of system/control theory. Through theory and simulation it provides insight into properties of a number of recursive estimation schemes that have proved to be of great practical value.

● G. K. Lausterer, W. H. Ray, H. R. Martens
Real Time Distributed Parameter State Estimation Applied to a Two Dimensional Heated Ingot
Automatica, vol. 14 (1978), p. 335 — 344

This paper is considered to be a really important contribution towards the bridging of the gap between control theory and potential applications in industrial situations. Of particular interest is the feasibility indication of on-line state estimation to soaking pit control.

● J. Rissanen
Modeling by Shortest Data Description
Automatica, vol. 14 (1978), p. 465 — 471

This paper is considered to be a really important contribution — a very novel and original approach to the model reduction problem viz in minimization of the number of digits and penalization of an over-parametrization in modelling.

"The authors can be proud of their achievements; IFAC can be proud of having such contributions in its Journal AUTOMATICA", Prof. Eykhoff said in ending his presentation.

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The IFAC Technical Committee on Components and Instruments

Historical background

The first meeting of the Committee took place in 1961 in Budapest and was chaired by Mr. G. Boromisza (Hungary): its name was then the Technical Committee on Components. Later on, the words "and Instruments" were added. The list of the chairmen and their terms of office are as follows:

G. Boromisza, (Hungary)	1960 — 1963
B. N. Sotskov, (USSR)	1963 — 1966
J. L. Shearer, (USA)	1966 — 1969
M. Nałęcz, (Poland)	1969 — 1972
H. W. Smith, (Canada)	1972 — 1975
A. E. Nisenfeld, (USA)	1975 — 1978
H. J. Leśkiewicz, (Poland)	1978 —

From 1961 as many as 20 meetings have been held in different countries, usually during IFAC sponsored or co-sponsored events.
B. N. Sotskov (S.U.), as chairman of the Committee, started the work on nomenclature in Automatic Control Components: it was partly based on discussions held during some Committee meetings.
M. Nałęcz (Poland), as chairman of the Committee, was the editor of a joint work of the invited Committee members "Trends in Control Components", Amsterdam 1974 North Holland.
The only one Symposium sponsored up till now by the Committee was the IFAC Symposium on Pneumatic and Hydraulic Components and Instruments in Automatic Control, held in May 1980 in Warsaw, Poland. Pergamon Press 1981 Proceedings edited by H. J. Leśkiewicz and M. Zaremba include 43 papers from 18 countries.
At present there are 41 members of the Committee from 24 countries.

Field of interest

Components and instruments in automatic control comprise a very large field and are differently understood by different people. The Committee is to deal with separate hardware units predetermined to form any system to control automatically whatever it may be. Computers are excluded but not the applications of microprocessors as they are a substantial part of some components and instruments.

Forms of activity

In its forms of activity the Committee is following a pattern developed in the majority of the IFAC Technical Committees, i. e. sponsoring and cosponsoring symposia within the Committee field of interest, and discussing some problems during the meetings of the Committee.
Due to its field of interest, the Committee does not only select members from two groups of people, i. e., academic and industrial, but it also has to develop the cooperation with other associations acting in the related fields. IMEKO, the International Measurement Confederation, is the traditional partner in that respect.

Future policy

The Committee intends to stimulate the exchange of professional experience among its members. This exchange should be effected not only by publications, but, in the first place, by personal contacts during Committee meetings and Committee sponsored events.

It is anticipated that the exchange will also facilitate a tentative prediction of the changes in components and instruments, what seems to be important as well for industry as for people developing some new automatic control theories since the revolutionary changes in components and instruments which have started are demanding a new approach to the theory. Some new results should be obtained, while some existing ones will become useless.

Following this line the Committee has prepared the Round Table Discussion RT-3 "The Effect of Intelligent Instrument Developments on Design Concepts of Automatic Control Systems" for the IFAC Kyoto 81 Congress. Under preparation is also the "IFAC Symposium on Components and Instruments for Distributed Control Systems" to be held in Paris (France) in December 1982 sponsored by the Committee.

Other activities in this line are under consideration.

H. J. Leśkiewicz, Poland

Social Effects of Automation: A Matter of Concern?

John E. Rijnsdorp (Netherlands)

Every automation or control engineer has ideas about the impact of his/her technology on man, enterprise, country, and the world. As a group, automation engineers appear to hold the view that automation is inherently good; that it should be developed more and more; that in the long run difficulties will be overcome and the final result will be beneficial to everybody.
Outside our circle, however, pessimistic voices are louder: Automation degrades human work; it deprives human beings of autonomy and privacy; It reduces variety and care for the individual; and in most western countries, it is an important cause of unemployment.

During the IFAC Congress held in Paris in 1972, some control engineers got together and decided to study positive and negative effects of automation in more detail and depth. In this way, the TC on Social Effects of Automation was born. One of the godfathers — Phil Sprague — became the enthusiastic and inspiring first chairman.

In the face of the bewildering variety of problems, aspects, and effects, a choice had to be made. It was decided to focus on the impact of automation on work environment, content and quality. This is an area in which many automation engineers are directly involved and where they can exert some identifiable influence.

As a first assessment of this topic, a workshop was held in Bad Boll (FRG) January 1974, (1). The participants assisted in formulating a statement, directed at every control/automation engineer, which still is very much to the point today.

The follow-up was a workshop held in Enschede (NL), November 1977, (2). There the strong interaction became apparent between automation and organization, which led to the third workshop in the series: The Impact of Automatic Control and Information Systems on Organization in the '80's, held in Youngstown (Ohio, USA), October 1980. In addition, during IFAC Congresses (1975 and 1978) activities were devoted to the same topic.

During the past 6 years, the Committee has evaluated in various countries to improve quality of work experiments. In some cases results proved to be unsatisfactory; in one case there was (and we hope there still is) a surprisingly good combination of work efficiency and satisfaction through job enrichment and autonomous working groups. In the meantime, other social effects were not completely neglected. May 1979, a symposium was held in Bari (Italy) about Appropiate Automation Technology, which appears to be relevant for developed as well as for developing countries (3). The second symposium about a related topic will take place in 1983. Macrosocial and macroeconomic effects were discussed in a small but instructive workshop under the title: Automation, Demand for Work, and the Economy (Birmingham, May 1980).

The latest activity was a round table discussion on "User Participation in Systems Design", held during the IFAC Congress in Kyoto. Chaired by Fred Margulies and attended by representatives from eight countries the very interesting contributions resulted in the general opinion that participation of users in the design process is desirable not only from the users point of view but also from the point of view of control engineers and of management. In particular Sweden and Japan offered experiences to the effect that involving users in a very early stage means obtaining useful suggestions and at the same time enhancing the understanding for and the identification with the new system. National and cultural differences have to be taken into account, but essentially constraints will be found where there is a lack of information, of qualification and of motivation, resulting in a lack of efficiency when the new system is being implicated.

(ctd. next page)

Third Symposium on Automation in Mining, Mineral and Metal Processing

The symposium was held at the Ecole Polytechnique in Montreal (Canada), August 18 — 20, 1980. It was organized by the Ecole Polytechnique and by the Associate Committee on Automatic Control of the National Research Council of Canada under the chairmanship of Professor Jules O'Shea. 259 people from 28 countries were registered (114 were Canadian).

Out of the 112 papers that were submitted, 58 were accepted for presentation at the symposium. Corresponding to the main topics, 17 papers dealt with automation in mining, 22 with automation in mineral processing and 19 with automation in metal processing. Moreover, state-of-the-art papers were sollicited by members of the programme committee on topics of common interest for people working in these three areas. Six invited papers which were delivered at plenary sessions served as key-note addresses:

— Dr. G. R. Marchant (U.S.A.) delivered a review paper on Micro-Processing, Distributed Control and Advanced Instrumentation.

— Professor J. A. Lynch (Australia) dealt with Modeling and Control of Mineral Processing Plants.

— Dr. J. Luckers (Belgium) presented a survey paper on Automation in the Iron and Steel Industry.

— Dr. R. Tomlinson (U.K./IIASA) summarized an IIASA study on a Systems Approach to Coal Industry Problems.

— Professor T. J. Williams (U.S.A.) covered the application of Hierarchy Control giving numerous examples taken from the steel industry.

— The late Professor N. S. Rajbman had to be excused because of illness (his written paper, on Adaptive Control in Metallurgical Processes, will nevertheless appear in the Proceedings).

The program also included three round-table discussions.

The first was on "Energy Management for the Mineral and Metal Processing Industries": energy computer management systems from Japan, Netherlands and Canada were discussed reporting benefits of as much as 20% on energy savings and 35% on return on investment. Mr. R. F. Huth (U.S.A.) chaired the discussion.

The second was on "How Automatic Control Can Help Meet the Environmental Regulations": the participants felt that up to now there are rather limited applications of automatic controls for environmental purposes in mining due to the lack of good mathematical **models for prediction** applicable to air and water quality control and that often measurement techniques are not available. However, three people reported that, in mineral and metal processing plants, instrumentation and control can already assist significantly in environmental problems. Professor R. V. Ramani (U.S.A.) chaired the session.

The aim of the third round-table discussion was to exchange experiences and evaluate state-of-the-art and trends in Automation of Metal Rolling. The attention was focussed in particular to the use of smart sensors and the Kalman filter to determine unmeasurable quantities. Case studies of two computer control systems for hot strip milling (one in Japan, one in U.S.A.) and one on a plate mill, also in U.S.A., were presented. Examples of successful applications using micro-processors as controllers to set screwdowns on a billet mill, to position a conveyor and a crane and to adjust the spray on a continuous casting machine were given. The impact upon control strategies of changing quality requirements and pressures for improvements in operating efficiency were also discussed. Mr. W. E. Miller chaired the session.

Three post-symposium tours were each attended by about 40 delegates. There were technical visits to the Noranda Research Center in Pointe-Claire, Quebec, to the Sidbec-Dosco Steel Complex in Contrecoeur, Quebec and a two-day visit to Sudbury, Ontario where delegates toured the Clarabelle Concentrator of the Inco Metals Co. and the Falconbridge's Strathcona Concentrator.

It was observed that the largest group attending the symposium were users who compared experiences and offered valid and valuable contributions on the state-of-the-art and their expectations on future developments.

The third symposium certainly stimulated interest in continuing the series. Before it was over, groups from two different countries had already offered to organize the fourth symposium.

(Proceedings published by Pergamon Press, Headington Hill Hall, Oxford OX3 OBW, England)

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Social Effects (ctd.)

What are the plans for the future? The Committee seeks cooperation with other IFAC Committees to organize joint workshops or symposia. Along these lines, "Systems Engineering" and "Social Effects" are preparing a Conference on Man/Machine Systems, to be held in Baden-Baden (FRG) in September 1982; "Social Effects" and "Education" are just starting to think about a Conference on "Training for Automation Technology". Similar types of collaboration with other IFAC Committees are very welcome, as "social effects" are a matter of concern for every control engineer.

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J. E. Rijnsdorp; Case Studies in Automation, related to Humanization of Work (Pergamon 1979)

U. Pellegrini, C. Roveda; Criteria for the Selection of Appropriate Automation Technology (Pergamon 1981)

Newsletters IFAC Committee on Social Effects of Automation nr. 1 (1976) to nr. 10 (1980)

Delegates from countries around the world tour Falconbridge

P. b. b.