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Contents

Report from Council

The last meeting of Council was held at Helsinki University of Technology, on 10th August 1985 and fourteen countries were represented. The paragraphs below summarise the main items considered:

New Member Organisations

Czechoslovakia, Portugal and the Republic of Ireland were accepted by Council as new members and welcomed. Officers were instructed to approve the application from Hungary as soon as formal arrangements had been completed.

Reports from Officers

The President, Vice President and Immediate Past President concentrated on the achievements of EFOMP during the first five years of its development and upon communication within the organisation. There has been notable success in establishing active relationships with a number of international organisations and details are frequently referred to in *E.M.P. News*. Recently the Federation has responded to the W.H.O. on the role of Non Governmental Organisations and it is hoped that the outcome will be improved collaboration with the W.H.O. (Europe). Also the Federation has responded to the W.H.O. 'Strategy for Health for All by the year 2000' document, identifying six of the target areas as being within the scope of the Federation's activities.

The need to plan meeting dates far ahead and to distribute preliminary information on Scientific Meetings really early is paramount when the Federation's distribution system relies upon the Member Organisation as the final link in the chain. The Secretary General had compiled a fresh list of relevant addresses of EFOMP contacts within each Member Organisation and tabled copies. It was stressed that communications need to flow in both directions: that is from EFOMP to the members and from members to EFOMP.

The Treasurer reported modest progress with the project to attract co-operating commercial organisations. His budget projections required an increase in the capitation fee and the arguments had been accepted by the member organisations. Council agreed that for 1986 the capitation fee will be £0.90.

The current EFOMP officers are:

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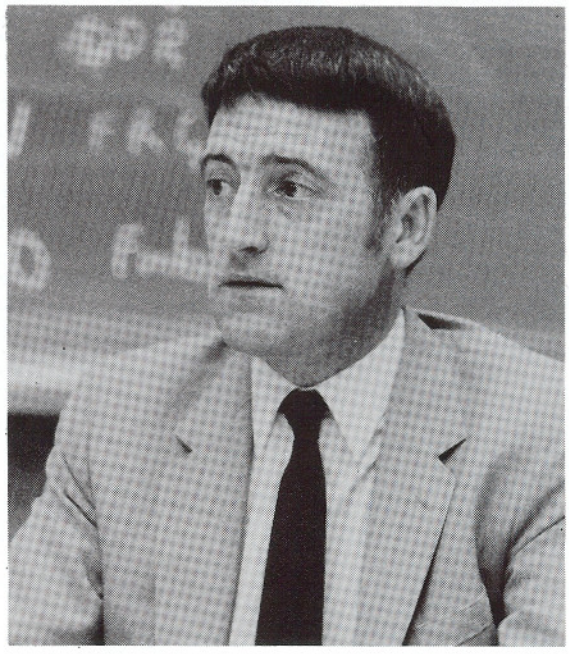
94805 Villejuif Cedex
France.
Phone: 01 559 4907



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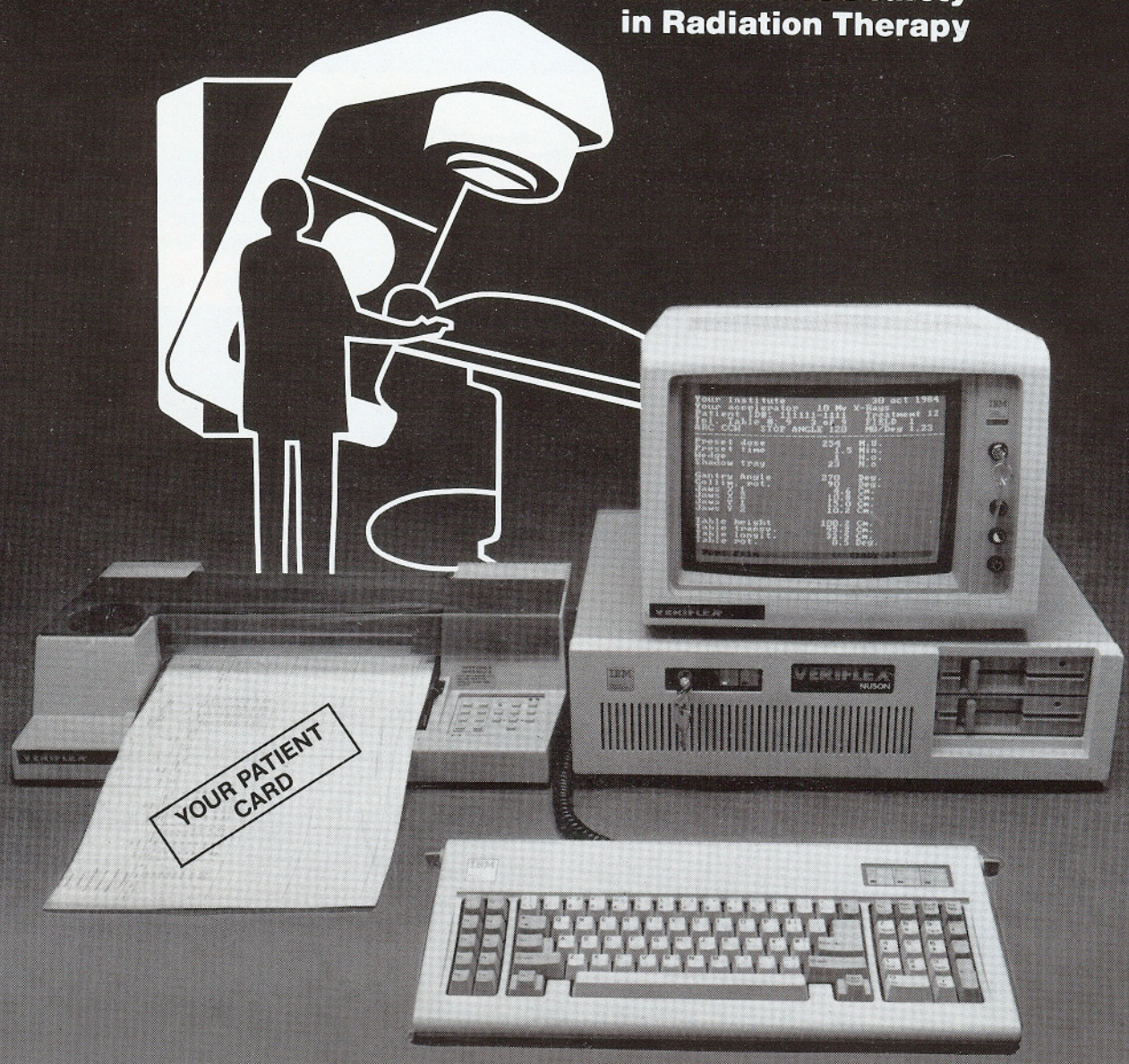

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EFOMP Constitution

The removal of the Office of Vice President and the consequential changes to the Constitution were discussed and unanimously accepted.

Education and Training Committee

There were formal reports of the work completed for the I.A.E.A. on training centres in Europe (see *E.M.P. News 10*) and the questionnaire on training methods, responses to which were awaited from the member organisations. It is hoped that during 1987 there can be a meeting to determine a syllabus for the training of the medical physicist. This meeting would take the form of a follow-up to the earlier Kiel meeting and be arranged in collaboration with the I.A.E.A., the W.H.O. and the E.C.

The Trieste Workshop on Quality Assurance in Diagnostic Radiology had been run successfully (see *E.M.P. News 10*) and a second workshop, in 1986, is therefore justified.

The composition of the Training and Education Committee for 1986 was considered and agreed as follows:

P. Inia	(Netherlands)	Chairman
A.-M. Schmitt	(FRG)	Secretary
K. Jessen	(Denmark)	
A. Benini	(Italy)	
J. Chavaudra	(France)	
P. Dendy	(U.K.)	
B. Breyer	(Yugoslavia)	
B. Potschwadek	(G.D.R.)	
B. Proimos	(Greece)	

Scientific Committee

Professor Poretti reported that there had recently been progress towards harmonisation of formats for the exchange of medical image data, a matter of long standing on the agenda of the Committee.

Council then considered a proposal for a specialised meeting on the technical feasibility and clinical significance of *inv-vivo* N.M.R. spectroscopy. It was felt that such a meeting would bring a fruitful association with manufacturers and focus on the scientific efforts of EFOMP members' organisations. It was agreed that a working group, to be chaired by Professor Poretti, should seek to arrange a self financing meeting.

The composition of the Scientific committee was discussed and it was agreed that it should be chaired by Professor Poretti for one more year. The following membership was suggested:

G. Poretti	(Switzerland)	Chairman
A. Benini	(Italy)	
S. Gurski	(G.D.R.)	
L. Sundbom	(Denmark)	
B. Lindskoug	(Sweden)	
E. Loewinger	(Israel)	
J. Rassow	(F.R.G.)	
G. Van Herk	(Netherlands)	
J.-C. Rosenwald	(France)	
P. Horton	(U.K.)	

Professional Committee

The committee is currently seeking views for a paper on the ethical problems which arise in medical physics work. The membership of the committee is:

H. Aget	(France)	Chairman
J. Rowan	(U.K.)	
W. Kalinga	(Austria)	
J. Pohl	(F.R.G.)	
M. Tautz	(G.D.R.)	

Publications Matters

Dr. Claridge reported that during the session the two EFOMP policy statements had been produced, as well as the issues of *E.M.P. News*. A number of suggestions were made for developments, including items on the research activities of individual departments and the inclusion of profiles of historic medical physicists. Such developments depend upon individuals volunteering as co-ordinators. *E.M.P. News* contacts are asked to be active in stimulating articles, collecting news and sending material to the editor and also to encourage individuals to offer to take responsibility for developing features.

How useful are electronic penetrameters for Quality Assurance measurements in radiodiagnosis?

A. Baeuml
Institut fur Strahlenhvgiene des Bundesgesundheitsamtes,
Ingolstadter Landstrasse 1, D-8042 Neuherberg, FGR.
Telephone: (0 89) 3187–0

There is no doubt that the tube voltage is a crucial parameter in diagnostic radiology as it influences both the image constrast and the exposure of the patient. This parameter is consequently of special interest in Quality Assurance (QA) work designed to ensure consistent performance of the X-ray machines in a radio-diagnostic department. It is very desirable that the set kV-value and the real tube voltage should coincide within a reasonable margin. To check this important parameter, easy to handle measuring tools are required.

Electronic kV-meters are certainly very appealing and might seem to be the only reasonable choice for checking the tube voltage. However the clear and unambiguous readings obtained on their digital displays may lead the prospective user to assume that these instruments are fool-proof and that the quickly and easily obtained information precisely represents the actual kilovoltage. These expectations are, in my view, a bit too optimistic and have to be corrected. As these modern electronic penetrameters are also quite expensive it is pertinent to ask whether they are really so much better than some simpler and less expensive tools.

What precision is needed in routine kV-measurements for Quality Assurance?

It must be kept in mind that the utmost precision is generally not needed in QA work. The methods and instruments to be applied in this field have to be sufficiently precise to detect meaningful deviations and they must not be very time consuming and difficult to handle. In my view the kV-measuring instruments for QA work should be capable of indicating reliably a deviation which is about 3 to 5% of the nominal kV-value. This requirement can be met by both electronic kV-meters and simpler, cheaper equipments if they are correctly calibrated and used. This is true not only for the well known kV-cassette but also for two very simple devices that have been developed recently by Prof. J. Cameron and one of his students[1] and in our Institute[2]. These two simple gadgets are so straightforward in their design that even a mechanic in a developing country will be able to construct them. They are penetrameters combining materials of low and medium atomic numbers to take advantage of the fact that absorption properties change very differently with the beam energy. My version of an inexpensive kV-test tool is based on an idea of a French radiologist in 1902. The concept has been developed in such a way that, e.g. at 70 kV a deviation of 2 kV can be detected. The test tool can be used both in the fluoroscopic and radiographic mode. In a version which will be made available commercially, permitting 6 different exposures on a 13 × 18 cm film, it will be clearly cheaper than a traditional kV-cassette.

Merits and drawbacks of electronic kV-meters

The most prominent feature of electronic kV-meters is not their absolute accuracy but their speed in performing a measurement. This advantage is, however, only present if the operator is very familiar with the instrument. It must be stressed again that these instruments are not really fool-proof and that some technical understanding and training is required to use them correctly and efficiently. That means that only larger X-ray departments, where many kV-measurements are performed by competent people, will take the full advantage of them. In this case the high price will be clearly outweighted by the lesser time needed.

There are two classes of electronic penetrameters on the market differing by about a factor of 3 in price. The simpler ones are not necessarily less precise but are generally easier to use. They can be used correctly by radiographers, with some training, if they are aware of the possible errors that may arise if, e.g. the detector is not centred exactly on the beam or is not irradiated perpendicularly; if it is irradiated at the wrong distance to the focus or if the filtration of the tube is different from the assumed value of 3 mm Al. The more expensive and more sophisticated instruments (NERO, DIGI-X, Keithley-kVp-divider) provide more information than just the kV-value. They are probably too complex for the average radiographer and are primarily meant for physicists and engineers.

I do not want to describe the strong points and disadvantages of the individual instruments. That has been done in a very good evaluation of electronic kV-meters by members of the Medical Physics group at Leeds[3] and which is to be published. This unbiased and detailed intercomparison should be read by every potential purchaser of an electronic kV-meter. He will learn that:

— calibration can be wrong even in expensive kV-meters;
— incorrect positioning of the detector can lead to substantial errors;
— systematic errors due to non-linearities have to be corrected.

Theratron 780-C

Cobalt 60 Teletherapy Unit

The Theratron 780-C features are:

- The largest axis to collimator clearance for any 80 cm S.A.D. cobalt teletherapy unit, with a 45 cm S.D.D.
- A new set of easy-to-install and easy-to-change collimator mounted accessories.
- A full dual timer system meeting IEC requirements
- A compact, easy-to-use hand control which can be connected either to the couch pedestal or to an overhead support. The hand control uses motion drive electronics which allow any combination of movements to be controlled simultaneously during set ups.
- Number interlocked wedges.
- Large field wedges.

The important features of the Theratron 780, well established in over 400 clinical systems, have been retained. These included the 200 Rmm source capacity; source drawer interchangeability with the Theratron 80; source head swivel with automatic, precision 0° lock; < 1 mm radius isocentricity; five motion couch with patented "C" arm open section.

Certain features of the Theratron 780-C can be field retrofitted to earlier 780's.

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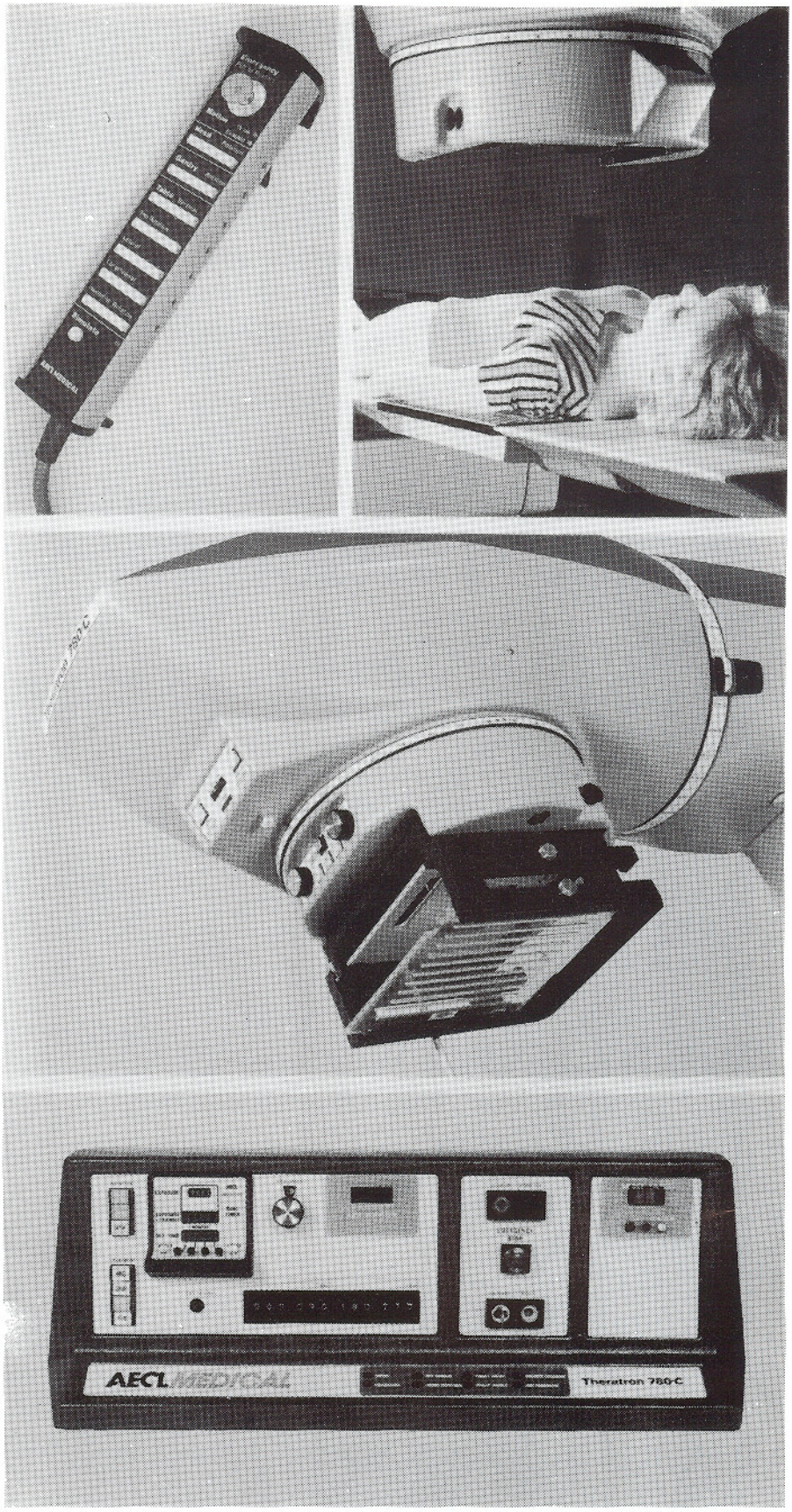

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You cannot expect me to say which of the available kV-meters is the best with respect to price and performance but I give three criteria that are in my view important for a good kV-meter. It should have:

— sufficient sensitivity to enable measurements under clinically realistic output conditions;
— a high dynamic range for easy handling, and;
— an individual calibration chart if absolute measurements are intended.

Conclusion

Direct reading, non-invasive kV-meters are impressive instruments providing the undeniable advantage of quickly available results, if the user is familiar with their handling. The precision of the readings must not be overestimated. The absolute accuracy of the readings is not substantially better than that of much cheaper test tools, if the latter are calibrated properly for the different wave forms. The electronic kV-meters should not be regarded as prestige objects but as tools for daily work only for those people who will take full advantage of them and who have to do many kV-measurements and therefore are familiar with the instruments and their limitations.

References

1 An inexpensive kVp-penetrameter.
Netto, T. G., and Cameron, J. R. (1985) Med.Phys. 12, pp. 259–260.

2 A simple test phantom for checking X-ray tube voltage.
Baeuml, A. (1985) Brit.J.Radiol.Supp. 18, pp. 100–102.

3 An evaluation of eight non-invasive electronic kV-measuring instruments.
Haywood, J. M. and Ryan, M. M. (To be published).

Medical Physics in Spain

The Spanish Society for Medical Physics (Sociedad Española de Fisica Médica) was founded in 1974. It now has 163 members, working in the various fields of Health Physics.

There are several permanent co-operative groups covering topics of general interest like Physical Dosimetry, Radiological Protection, Quality Assurance and Health Physics Teaching. These groups collect and select bibliographies, organise surveys, establish work protocols, etc., and probably the main result of these activities is the Spanish National Protocol for Dosimetry in Radiotherapy, published in 1984.

The Society meets once a year and also organises a general congress every two years, in which the different scientific activities of the members are presented. The most recent congress was held in San Lorenzo de El Escordial (Madrid), when the following topics were included in the scientific programme:

— Physical Dosimetry
— Clinical Dosimetry
— Radiological Protection
— Quality Assurance
— Signal Processing and Instrumentation
— Health Physics Teaching

73 contributions were presented either orally or as posters. There were also several most interesting invited lectures, including one entitled 'How does high quality medical radiation physics influence the treatment results' by Professor Svensson (Sweden) and another entitled 'Physical aspects of new prospects in medical diagnosis and therapy' by Dr. Llácer (California). The proceedings of the meeting have been published.

The next conference in the series will be held in Jarandilla (Cáceres) in 1987.

$(MP)^2$ Medical Physics Mini-Profile

HADASSAH MEDICAL ORGANISATION
The Hebrew University, Jerusalem, Israel

Research in medical physics is carried out in Jerusalem at the Clinical Radiation Physics Division and at the Medical Physics Division of the Racach Institute of Physics of the Hebrew University. The two groups work closely together and the radiation physicists are members of the Medical Physics Division of the Hebrew University.

The Clinical Radiation Physics Division is located at the Department of Radiation Therapy and Clinical Oncology of the Hadassah University Hospital. The treatment facilities there are: a Betatron (35 MeV), a linear accelerator (6 MeV), a Cobalt-60 unit, an Orthovoltage Simulator, a CT aided treatment planning unit and the associated dosimetry equipment.

The present main research topics are: *In vivo* (eye, skin) and *in vitro* analysis of trace elements employing X-ray fluorescence; *in vivo* measurements of bone density in the arm, leg and spine by Compton gamma-ray spectrometry, mainly for the study of Osteoporosis; light scattering in tissue; *in vivo* Oxymetry and dielectric constant measurements; haemodynamics and the physical aspects of blood clotting; and the efect of radiosensitisers on the vascular system.

For details contact Professor A. Weinreb, Racach Institute of Physics, The Hebrew University, Jerusalem, or Dr. E. Loewinger, Department of Oncology, Hadassah Medical Organisation, Jerusalem, Israel.

Laser Position Lights for Nuclear Medicine

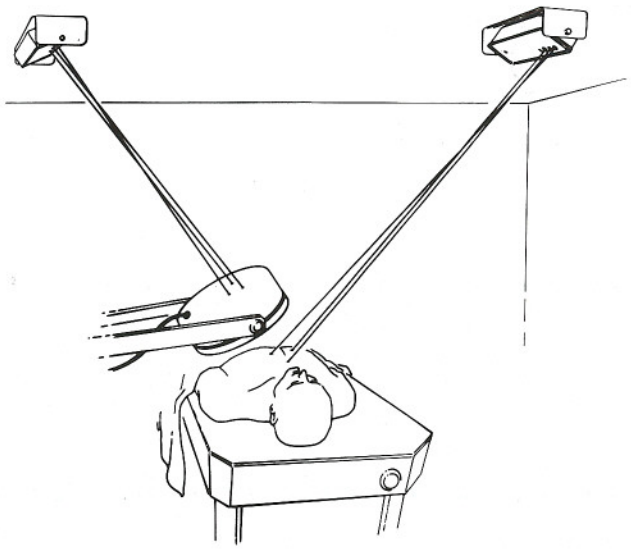
To assist in the achievement of reproducible patient positioning relative to the gamma camera, when the camera is used in time sequenced studies, Gammex Inc. has introduced new laser systems. Cardiac imaging studies, using thallium and an interval of several hours between examinations, provide an example of the circumstances in which the systems are particularly useful. It is claimed that the new systems provide gamma camera and patient position references considerably improved over the conventional techniques.

One laser systems: The laser may be wall or ceiling mounted and it projects three bright red dots onto the gamma camera detector head or the patient. The dots are about 4mm in diameter and 10cm apart, when the source is about 2m away. The equipment is set up for the first study and the position of the dots on the camera head is marked. After the study is complete the head is moved and the position of the dots is then marked on the patient. At the return visit the patient and then the detector head are positioned so that the dots are re-aligned.

Two-laser systems: Usually both lasers are ceiling mounted. The principle of use is essentially the same as for the one laser system. The potential of camera or patient movement during or after recording dot positions is reduced, if one system is used for the detector head and one for the patient.

The units are approximately 42 × 13 × 10 cm and weigh 5.2kg. The beam energy is less than 5mW; wavelength is 6328A; the range is about 9m. The units are certified for FDA Class II laser use.

Further details from Gammex, Inc.
Milwaukee Regional Medical Centre
P.O. Box 26708
Milwaukee, WI 53226, U.S.A.



The training of the Medical Physicist as a Qualified Expert

Comments on the Report and Recommendations on EC Directive 84/466 of 3 September 1984 for Radiation Protection of Patients, prepared by EFOMP Committee on Education and Training.

Preamble

The Council of the European Community published a directive laying down basic measures for the radiation protection of persons undergoing medical examinations or treatment. In this directive:

Article 2, §1 reads:

Without prejudice to Directives 75/362/EEC and 75/363/EEC, as amended by Directive 82/76/EEC, and Directives 78/686/EEC and 78/687/EEC, Member States shall take all appropriate measures to ensure that any ionizing radiation used in medical procedures is effected under the responsibility of doctors or dental practitioners or other practitioners who are entitled to perform such medical procedures in accordance with the national legislation and who, during their training, have acquired competence in radation protection and received adequate training appropriate to the techniques used in medical and dental diagnostic radiology, in radiotherapy or in nuclear medicine.

Article 5 reads:

A qualified expert in radiophysics shall be available to sophisticated departments of radiotherapy and nuclear medicine.

The definition of such a qualified expert is given as:

Person having the knowledge and training needed to carry out physical or technical tests, or radiochemical tests, or to give advice in order to ensure effective protection of individuals and correct operation of protective installations, as the case may be, whose capacity to act as a qualified expert is recognised by the competent authorities.

Introduction

National organisations gathered in EFOMP regard it as their responsibility to ensure the expertise in medical radiation physics to the Qualified Expert in radiophysics as mentioned in Article 5 of the EC Directive 84/466 Euratom of 3 September 1984.

The Qualified Expert carries out the physical tests, gives advice on dosimetry and acts as responsible expert in radiation protection. This Qualified Expert acts complementary to the skills and responsibilities of the medical practitioners as mentioned in Article 2, §1 of the same Directive.

These arrangements should apply to all medical departments using ionizing radiation on patients, i.e. radiodiagnostics, nuclear medicine and radiotherapy.

Principles of training

The Committee on Education and Training of EFOMP has considered this Directive and proposes the following requirements on education and training for the Qualified Expert.

The Committee recommends in accordance with the Policy Statement on Education and Training, that the Qualified Expert should firstly have an education in physical sciences, that provides an adequate scientific basis in radiation physics on the level of a masters degree or its equivalent. This level may be attained in different ways depending on the educational situation in a country, e.g. a PhD in radiation physics, a bachelors degree in physical sciences and a consecutive vocational training in medical radiation physics or a similar postgraduate specialists' training.

Such a person should have two years experience in medical radiation physics. In these two years he/she should acquire practical and adequate experience in dosimetry and the use of radioactive material and/or in the operation of systems for the generation of ionizing radiation and/or irradiation units with radioactive sources in medicine as applied to patients.

The formal part of the training should include the legal aspects of the application of radiation in medicine and the responsibilities of the authority in radiation protection. The attainment of the status of the Qualified Expert will normally be recognised by the competent national authorities and/or by the national professional organisations for medical physics.

Curriculum of courses in Radiation Protection for the Qualified Expert

Basic courses

It is assumed that participants will have already sufficient skills and knowledge in fundamental radiation physics:

— fundamentals of radiation biology, including effects of low doses;
— fundamentals and basic principles of radiation protection with respect to patients, occupationally exposed radiation workers and the public in general;
— natural and artifical exposure in man;
— physical and legislative measures to be taken in case of accidental and/or incidental exposure of man;
— legislative status and duties of the Qualified Expert.

Special courses

There should be special courses dedicated to special fields of application, e.g.:

Nuclear Medicine

(1) Physical characteristics of radionuclides.
(2) Production of radionuclides:
— reactor, accelerator, radionuclide generators.
(3) Production of radioactive pharmaceuticals and pharmaceuticals marked with radioactive substances.
(4) Purity of radioactive pharmaceuticals:
— purity of radionuclides, radiochemical purity, chemical purity, pharmaceutical purity.
(5) Biokinetics of radioactive substances:
— incorporation, distribution, excretion.
(6) Radiotoxicity.
(7) Dose calculations.
(8) Measuring methods and -devices.
(9) Practical radiation protection measures:
— transport and storing of radioactive substances, handling of radioactive waste.
(10) Radiation protection of the patient in diagnostics and therapy.
(11) Radiation protection of the staff in diagnostics and therapy.
(12) Radiation protection of the environment.
(13) Radiation protection by preventive structural measures in buildings.
(14) Instructions in case of accidents or incidents.
(15) Special legal requirements and guidelines.
(16) Technical rules.

Radiation Therapy

(1) Physical principles and technical equipment of irradiation facilities:
— X-ray therapy equipment, gamma irradiation units, circular and linear accelerators, therapeutic neutron facilities, sealed radioactive substances.
(2) Control of irradiation facilities and radioactive sources.
(3) Biological fundamentals of radiation therapy.
(4) Clinical dosimetry, methods of dose evaluation.
(5) Irradiation planning — medical part, physical part.
(6) Radiation protection of the staff.
(7) Radiation protection of the environment.
(8) Instructions in case of accidents or incidents.
(9) Radiation protection by preventive structural measures in buildings.
(10) Special legal requirements, guidelines, official proceedings and inspections.
(11) Technical rules.

Radiodiagnostics

(1) Physical principles and technical equipment of diagnostic radiology facilities.
(2) Control of diagnostic radiology facilities.
(3) Imaging techniques and their effect on the radiation exposure of the patient.
(4) Quality control.
(5) Evaluation of the radiation exposure of the patient.
(6) Radiation protection of the staff.
(7) Radiation protection by preventive structural measures in buildings.
(8) Instructions in case of accidents or incidents.
(9) Special legal requirements and guidelines.
(10) Technical rules.

Practical experience

The two years of practical experience should involve working in a clinical environment under the professional supervision of a qualified medical physicist who is an expert in radiophysics. This professional supervision cannot be found among other medical, paramedical or technical specialties.

The nature of the work during this period shall include standardisation and calibration of medical radiophysical equipment and control of the accuracy and safety of radiophysical methods used in routine clinical applications in close cooperation with medical doctors and paramedical personnel.

A certified record of this period of practical experience should be maintained.

Assessment

Certified assessment on the successful completion of the designated training should be established in order to get recognition as a Qualified Expert in radiophysics from the competent national authorities.

Acknowledgement

This report was prepared by J. S. Orr (Chairman), A. Benini, P. Inia, A.-M. Schmitt when the EFOMP Committee on Education and Training met at Neuherberg (FRG) on 14–15 June 1985. The report was presented at the EFOMP session on Radiation Protection of the Patient during the XIV International Conference on Medical and Biological Engineering and VII International Conference on Medical Physics at Espoo, FINLAND, August 1985.

Invitation for comments

EFOMP officers and Council agreed on publication of these recommendations. Medical Physicists and National Organisations are encouraged to submit their comments to the secretary of EFOMP Committee on Education and Training: Pieter Inia, PhD, Klinische Fysica KCL, P.O. Box 850, 8901 BR Leeuwarden, Netherlands.

Pattern Recognition Conference

A note on the 3rd International Conference of the British Pattern Recognition Association.

For the third time the British Pattern Recognition Association was host to the International Conference on Pattern Recognition, at a meeting which took place in St. Andrew's, Scotland on 25—27th September, 1985. About 200 researchers gathered from 15 countries to discuss current advances in pattern recognition. Out of a total of 105 papers given, about 45% were related to practical applications of pattern recognition.

It was interesting to observe that medical applications represented the highest percentage (28%) of all the applications presented (for comparison other major classes were: motion – 18%, radar – 18%, industrial – 16% and voice recognition – 11%). The topics covered included medical microscopy, chromosome classification, automated E.E.G. segmentation and the presentation, analysis and understanding of body images. An excellent survey of various body imaging techniques and relevant computer processing methods was given by Prof. F. Deconinck from Vrije University, Brussels, Belgium, in which he discussed thermography, ultrasound, angiography, emmission tomography, C.T. and M.R.I. He stressed that in many instances the clarity of an image can be improved simply by the removal of that information which is not relevant to the particular investigation.

If the papers presented at the conference truly reflect the situation in the pattern recognition field then the following conclusions may be drawn:

— There were signs of a period of 'horizontal growth'. Firstly the presence of relatively few real innovations but an extensive exploration of established techniques in the form of improvements and refinements. Secondly an increasing number of practical applications, including commercial products.
— There is, surprisingly, relatively little interest in the use of Artifical Intelligence based techniques in pattern recognition.
— A lot of activity seems to be concentrated at present around parallel computing technology, particularly in computer vision applications.

Many of the presented papers will be published in the Spring 1986 issues of *Pattern Recognition Letters* (published by Elseiver Science Publishers b.v. (North Holland)). The 4th International B.P.R.A. Conference will be held in Cambridge in September 1987.

E.S.

Comparative Evaluation Reports on Medical Devices

In *EMP News* Number 7 (December 1983) an 'International List of Comparative Reports and Market Surveys', prepared by the Advisory Centre for Medical Technology (AMT), a part of the Institute of Medical Physics TNO, the Netherlands, was published. Publication of that list and the intention to publish future updates, in *EMP News*, was the result of an agreement between the WHO Regional Office for Europe and EFOMP.

The list provided full details of the publisher of the report so that individuals could make a direct approach in order to obtain copies. The format of material produced by AMT-TNO has now been changed and a current list of reports included on the AMT-TNO file is reproduced below. It is suggested that those who would like further information should contact AMT-TNO and purchase their list of summaries of the evaluation reports, which costs $25. The list provides shortform information on the contents of the reports, details of the publisher and the details of source of supply. This list of summaries can be obtained from:

TNO Medical Technology Unit Advisory Centre
P.O. Box 188
2300 AD LEIDEN
The Netherlands

TITLE	YEAR
Evaluation: Electric Beds	78
Evaluation des electrocardiographes 1 & 3 pistes	78
MFI-test foetale bewakingsapparatuur	78
MFI-test external pacemakers	78
MFI-test sphygmomanometers	78
Evaluation: Hospital Grade Duplex Receptacles	78
Evaluation: Gas-powered Resuscitators	78
Evaluation: Photoelectripulse Monitor	78
Evaluation: Artificial Airways	78
Evaluation: Portable Suction Sources	78
Evaluation: Kabo Electronics Ground Fault Detectors	78
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New Publications

An Introduction to Emission Computed Tomography
Edited by E. D. Williams
Institute of Physical Sciences in Medicine: Report 44; London 1985
65pp + x; ISBN 0 904181 00 6. Price £9.50

This book contains contributions from ten leading practitioners. It describes the salient features of the theory of tomographic reconstruction, examines practical considerations and then describes the various types of single photon and positron tomography. Finally the clinical applications described indicate the achievements to date and the developments anticipated. There is a comprehensive bibliography of more than 150 literature references.

Obtainable from IPSM Publications, 47 Belgrave Square, London SW1X 8QX, England. (Add 5% postage and packing: EFOMP members may deduct 30% for personal copies).

Linear Accelerators for Radiation Therapy
D. Greene
Adam Hilger Ltd. Medical Physics Handbooks 17; Bristol 1985
194pp + viii; ISBN 0 85274 557 5. Price £19.50

The volume aims to provide a basic understanding of the wide range of technology involved in the design and operation of linear accelerators used in the exacting conditions of medical applications. The principles and operation of accelerating waveguides and of all the ancilliary equipment are described. Also treatment room design and machine commissioning are considered. The book concludes with a section on treatment simulators.

IEC Safety Handbook
International Electrotechnical Commission: Geneva 1985
Price 80 Sw. Fr.

Safety in the home and workplace. With the growing complexity and the more widespread use of a large variety of electrical equipment, safety standards are increasingly gaining importance in the design, development, production, testing and maintenance of such equipment. Their existence and application is an important tool for the protection of user interests.

Designed for technical departments in industry, testing laboratories and for those responsible for public safety as well as those involved in the preparation of safety standards at international and national level, the IEC Safety Handbook brings together all of the 23 IEC basic safety standards relating to the safety of people, surroundings, livestock and domestic animals.

The IEC Safety Handbook has seven sections:

I. Guide to the drafting of safety standards, and the role of Committees with safety pilot functions and safety group functions, including principal elements of the safety objectives for electrical equipment.
II. Protection against electric shock.
III. Insulation coordination for low-voltage.
IV. Test methods for resistance to tracking.
V. Test methods for assessing fire hazards.
VI. Identification systems.
VII. Degrees of protection provided by enclosures.

The Computation of Dose Distributions in Electron Beam Radiography
Edited by Alan E. Nahum
University of Umea, Sweden; 1985.
Price 150 Swedish Crowns or US$20

The contents of this volume are:
Uncertainties in dose determination – H. Svensson
CART – a challenge in Medical Computing – H. Dahlin
Electron stopping power and range – A. Nahum
Electron Scattering – P. Andreo
Electron Transport Theory – A Brahme
Monte Carlo electron simulation – P. Andreo
Electron depth-dose distribution – A. Nahum and A. Brahme
'Broad-beam' algorithms – P. Andreo
The M.D.A.H. pencil-beam algorithm – A. Nahum
Generalised gaussian computation model – I. Lax
Calculations for arbitrarily shaped fields – I. Bruinvis
Development of a clinical algorithm at Institut Gustave Roussy – E. Briot
Review of current algorithms – A. Brahme
Commercially available algorithms – A. Nahum
Use of CT-numbers in electron beam therapy – H. Huizenga
Monte Carlo applications in treatment planning – A. Nahum

Copies may be obtained from: Anna Wernblom, Radiation Physics Department, University of Umea, S–901 85 Umea, Sweden.

Clinical Physics and Physiological Measurement

Members are reminded that this EFOMP journal is available to them at reduced rates, for their personal use. Enquiries should be made to Mr. D. S. Robertson, Executive Editor, The Institute of Physics, Techno House, Redcliffe Way, Bristol BS1 6NX. The contents of the two most recent issues are listed below:

Volume 6, Number 3, August 1985.

Papers
A new approach to non-invasive quantitative study of hepatic haemodynamics using radiocolloids in vivo *A Magrini, G Izzo, M Guerrisi, A Favella, R Picardi, L Valeri and R Cortesini*
Effects of changes in heart rate and atrial filling pressure on the performance characteristics of isolated perfused pumping rat hearts *T J van der Werff, T D Noakes and R J Douglas*
The routine measurement of platelet volume: a comparison of light-scattering and aperture-impedance technologies *E A Trowbridge, D M Reardon, D Hutchinson and C Pickering*
A new laser interferometer for the stimulation of pattern-reversal visual evoked potentials *R Kusel, W Wesemann and B Rassow*

Short communications
Lead uptake in humans by whole body counting ^{203}Pb: assessment of errors *H M James, M E Hilburn and J A Blair*
Calibration and measurement of the inhaled smoke volume in cigarette smoking *G Woodman, S P Newman, D Pavia and S W Clarke*
A sound stimulator with electronic memory for testing infant's hearing *C J Bygrave and J C Stevens*
The claimed vassodilatory effect of a commercial permanent magnetic foil: results of a double-blind trial *A T Barker and M W Cain*

Letters to the Editor
Comment on 'Photon scattering measurements of calcaneal bone density: results of in vivo longitudinal studies' *R B Mazess and J A Hanson*
Reply to 'Comment on photon scattering measurements of calcaneal bone density: results of in vivo longitudinal studies' *J G Roberts and C E Webber*

Book reviews
Measurement in Clinical Respiratory Physiology (Medical Physics Series). Aerosols and the Lung: Clinical and Experimental Aspects. Digital Radiology: Physical and Clinical Aspects. Hematoporphyrin Derivative Photoradiation Therapy of Cancer.

Forthcoming events

Volume 6, Number 4, November 1985

Review article
Nuclear-based techniques for the *in vivo* study of human body composition *S H Cohn and R M Parr (ed)*

Papers
Normal values for trabecular and cortical bone in the radius measured by computed tomography *R Hesp, C Doré, L Page and R Summers*
A scanning light diffractometer for muscle studies *A F Leung*
Relfection of CO^2 laser radiation from typical surfaces encountered in hospital environments *D C Petruse, G R Bennett, R M Clement and W M Davies*
Exposure treatment of the burned patient — a computer simulation of the thermal environment and its effect on evaporation and heat loss *C J Martin, R Wytch and I F K Muir*
A computer controlled calibrator, spectrum overlap eraser and automatic sensitivity control for an anaesthetic mass spectrometer *P C W Beatty and J M Cooley*
An automated method for the measurement of oxygen consumption and carbon dioxide excretion in man *I W Fellows and I A Macdonald*

Short communications
Recording Doppler blood flow signals on magnetic tape *R H Smallwood*
An *in vivo* radiotracer method to allow for cigarette filter ventilation during smoking *G Woodman, S P Newman, D Pavia and S W Clarke*

Book reviews
Clinics in Diagnostic ultrasound: Vascular and Doppler Ultrasound. Ferroelectrics: Proceedings of the First International Symposium on Piezoelectricity in Biomaterials and Biomedical Devices, Pisa, Italy, June 1983. Measurement of Joint Motion: A Guide to Goniometry. Handbook of Hemodynamic Monitoring.

Forthcoming events

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Forthcoming Meetings

International Conference on Ultrasound in Medicine.
7–8 April, 1986; Bath, England.
Dr. F. A. Duck, Medical Physics Department, Royal United Hospital, Combe Park, Bath BA1 3NG, ENGLAND.

International Conference on Electronics in Medicine and Biology.
7–10 April, 1986; Nottingham, England.
The Conference Secretariat, Institution of Electronic and Radio Engineers, 99 Gower Street, London WC1E 6AZ, ENGLAND.

Obstetric and Neonatal Blood Flow.
8–9 April, 1986; London, England.
Biological Engineering Society, Royal College of Surgeons, 35/43 Lincoln's Inn Fields, London WC2A 3PN, ENGLAND.

Dosimetry by Radiothermoluminescence.
17–18 April, 1986; Rennes, France.
J. P. Manens, Laboratorie de Radio-Physique, Centre Eugene Marquis-Pontchaillou, 35033 Rennes Cedex, FRANCE.

7th International Conference on Modern Trends in Activation Analysis.
23–27 June, 1986; Copenhagen, Denmark.
Dr. Kaj Heydorn, Isotope Division, Risø National Laboratory, Post Box 49, DK–400 Roskilde, DENMARK.

5th International Conference on Mechanics in Medicine and Biology.
1–4 July, 1986; Bologna, Italy.
Professor G. Paltotti, Faculty of Medicine and Surgery, Department of Physics, University of Bologna, Via Irnerio 46, 40126 Bologna, ITALY.

8th International Congress of Radiation Research.
19–24 July, 1986; Edinburgh, Scotland.
Dr. E. Martin Fielden, Secretary-General 8th I.C.R.R., M.C.R. Radiobiology Unit, Harwell, Didcot, Oxon OX11 0RD, ENGLAND.

Physics and Technology of Hyperthermia (A NATO Advanced Study Institute)
26 July–9 August, 1986; Urbino, Italy.
Dr. S. B. Field, MRC Cyclotron Unit, Hammersmith Hospital, Ducane Road, London W12 0HS, ENGLAND.

Mecombe '86 – 4th Mediterranean Conference on Medical and Biological Engineering.
9–12 September, 1986; Sevilla, Spain.
The Secretariat, Mecombe '86,Ed. Sevilla-1, 8.°,19, Avda. Ramón y Cajal, 1, 41005–Sevilla, SPAIN.

3rd International Conference on Measurement in Clinical Medicine.
9–11 September, 1986; Edinburgh, Scotland.
The Secretariat, 3rd IMEKO Clinical Measurement Conference, Institute of Measurement and Control, 87 Gower Street, London WC1E 6AA, ENGLAND.

Thermomedica 86 – The Fourth Congress of the European Association of Thermology.
10–13 September, 1986; Graz, Austria.
Dr. H. Waltner, Secretary General, Thermomedica 86, Raubergasse 27, A–8010 Graz, AUSTRIA.

Slovak Medical Society: 2nd Symposium of Radiological Physicists with International Participation.
22–24 September, 1986; Bratislava, Czechoslovakia.
Dr. Viera Laginová, Secretary-General, Institute of Clinical Oncology, Heydukova 10, 812 50 Bratislava, CZECHOSLOVAKIA.

Blood Flow in the Brain.
Blood Flow in Artificial Organs and Cardiovascular Prostheses.
23–25 September, 1986; Glasgow, Scotland.
Biological Engineering Society, Royal College of Surgeons, 35/43 Lincoln's Inn Fields, London WC2A 3PN, ENGLAND.

3rd International Evoked Potentials Symposium.
28 September–1 October, 1986; West Berlin, Federal Republic of Germany.
Dr. C. Barber, Medical Physics Department, Queen's Medical Centre, Nottingham, ENGLAND.

Asian Regional Conference of the International Organisation for Medical Physics.
8–12 December, 1986; Bombay, India.
Dr. P. S. Iyer, Secretary, AMPI, Division of Radiological Protection, Bhabha Atomic Research Centre, Bombay–400 085, INDIA.

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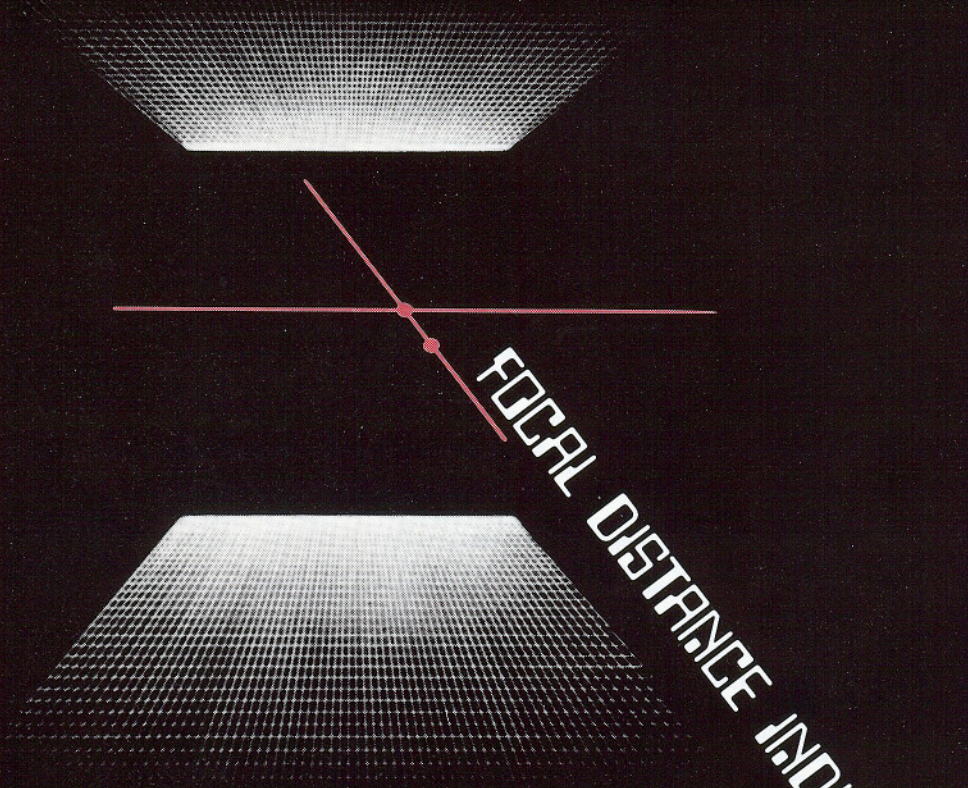

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