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european medical physics news

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the President

The 6th International Congress of Medical Physics in Hamburg has come and gone – a Congress judged by many to be the most successful in the series so far. Our congratulations to Dieter Harder and his colleagues in DGMP for such smooth organization and smiling imperturbability in the face of all difficulties. The Federation's Symposium on 'The Role, Status and Responsibilities of the Clinical Radiation Physicist' was well supported and many useful points were made during the subsequent discussion. It was generally agreed that the working papers of the Symposium provided a reasonable framework upon which the committees of the Federation could develop detailed policy statements. Earlier in the Conference the training of bioengineers had been discussed at some length and it was interesting to see the marked similarity between the bioengineering proposals and those of our own Education Committee. This must surely be an area for collaboration between physicists and bioengineers in Europe.

At the IOMP Council Meeting Professor Alexander Kaul was elected President of IOMP in succession to Professor John Mallard. We are pleased to see the Presidency remain within the ranks of EFOMP and say 'Thank you and well done' to John, and 'Congratulations and best wishes' to Alexander. The 7th ICMP will be in Helsinki in 1985 and the Federation must now turn its thoughts to the contribution it proposes to make to that Congress.

Our more immediate objectives are the contribution that EFOMP will make to the Vth European Congress of Radiology to be held in Bordeaux in September 1983. Our Vice President, Jean Chavaudra, has been working overtime contributing to the organisation of the scientific programme. There are three sessions devoted to:– quality assurance in diagnostic radiology; quality assurance in radiotherapy; and the organisation of imaging departments. These are three subjects which are currently of great interest to medical physicists and will provide an opportunity for a useful dialogue with our radiologist and radiotherapist colleagues.

Quality assurance, and training schemes for medical physicists seem to be a recurrent theme. They are both issues of major concern to WHO. On the 29th of October Dr. Benini and I, representing EFOMP, and Professor Kaul representing IOMP, met in Munich with Dr. Racoveaunu, the Chief Medical Officer for Radiation Medicine at WHO, to discuss the role that EFOMP and IOMP can play in collaboration with WHO. This was a most useful meeting and Dr. Racoveaunu discussed at some length the aims and objectives of WHO in the field of radiation medicine, particularly in respect of the Third World. A number of areas were identified in which EFOMP can play a useful role and the Officers of the Federation will consider these in more detail at their next meeting. Any collaborative programme between WHO and EFOMP will be organized through the Regional Office for Europe of WHO. A formal collaborative agreement has been signed with that office, more details of which are given elsewhere in this edition of EMPN.

Collaboration with IAEA is also on the move. This collaboration is directed at the organization of appropriate training for medical physicists and the Education Committee is currently preparing suitable proposals for submission to IAEA for their support.

Looking forward, there are very interesting times ahead for the Federation with the opportunity to collaborate with international organizations to develop both medical physics related programmes and training schemes for medical physicists. The emergence of these collaborative proposals supports the belief of the founders of EFOMP that a collective voice for medical physics in Europe could be an effective voice. That voice has now been heard, the international bodies have responded, and it is now up to members of the Federation to convert our words into deeds. Can we develop quality assurance techniques in Europe that can subsequently be used for the benefit of the third world? Can we produce a training scheme for medical physicists that can form a blueprint for others to copy? Are those countries who lead the field in the application of medical physics prepared to assist the Federation in designating centres that can provide experience and training for medical physicists from other countries? I am confident that the Federation has the courage and the will to grasp these opportunities, but the active participation of every individual member of the Federation is required to achieve the ultimate success.

John S. Clifton

Liaison with W.H.O.

The guidelines for a joint programme of collaborative work with the W.H.O. Regional Office for Europe have been established. An agreement bringing the programme into effect was signed on behalf of EFOMP on 1st December 1982. The main elements of the programme, which will be reviewed after two years, are as follows:

- exchange of information (including dissemination of information)
- attendance at each others' meetings
- mutual assistance in support of planning, programming and implementation of country programmes
- joint actvities in setting of standards and development of criteria
- joint planning of publications on scientific and technical matters
- joint fundraising for extrabudgetary activities
- data collection of support of a specific programme
- joint planning, programming and implementation of operational research
- preparation of material for celebration of World Health Day
- special role of Non Governmental Organisations (NGOs) in co-ordinating the work of other NGOs within the same programme areas.

The above list is no more than an indication of possible joint areas of collaboration and is in no way exhaustive.

Within these elements specific activities will be developed which are in accord with those parts of the W.H.O. Seventh General Programme of Work (1984-89) which apply to Europe. Dr. Kirsten Staehr-Johansen will be responsible for liaison with the Federation and we look forward to seeing her at EFOMP meetings in the future.

John S. Clifton

Contents

Notes from the Council

Members

The President reported upon the pending applications for membership of EFOMP from organisations in Bulgaria, Czechoslovakia, Eire, Hungary and Portugal. Delegates from Denmark, the German Democratic Republic and Israel were welcomed for the first time.

Finance

The Officers had recommended an increase in the EFOMP capitation fees for 1983 and after much discussion Council agreed that the proposal should be put to the member bodies. It was pointed out that both EFOMP and the manufacturers would benefit considerably if more advertising were introduced to EMP News. All members were asked to promote this facility whenever possible.

Committee Membership and Officers

Appointments for 1982/83 have been made as follows:–

President	J.S. Clifton	(UK)
Vice-President	J. Chavaudra	(France)
Secretary-General	A. Benini	(Italy)
Treasurer	H. Bergmann	(Austria)

Professional Committee

P.E. Åsard	(Sweden) Chairman
H. Aget	(France)
A. Piron	(Belgium)
J.O. Rowan	(UK)
M. Tautz	(German Democratic Republic)

Education Committee

J.S. Orr	(UK) Chairman
A. Benini	(Italy)
J. Chauvaudra	(France)
A. Kaul	(Federal Republic of Germany)
P. Potschwadek	(German Democratic Republic)
B. Proimos	(Greece)

Scientific Committee

G.G. Poretti	(Switzerland) Chairman
A. Kaul	(Federal Republic of Germany)
S. Lillicrap	(UK)
B. Lindskoug	(Sweden)
E. Loewinger	(Israel)
A. Piron	(Belgium)

Publications Committee

E. Claridge	(UK) Chairman
D.J. Dowsett	(Eire)
G.G. Poretti	(Switzerland)
J. Chauvaudra	(France) – PMB
C. Franconi	(Italy) – CPPM
N. Ulsø	(Denmark)

IOMP

EFOMP is to have two delegates to the IOMP Council. They will be full members without voting rights.

Committee Work

The Scientific, Education and Professional Committees await comment from the national organisations on the Symposium discussion documents.

The Education Committee indicated that it would like to develop syllabus guidelines and to investigate sources of finance for exchange scholarships. The Professional Committee is interested to consider the ethical problems encountered by physical scientists working in medicine. The Scientific Committee will consider a variety of suggestions for meetings, liaison and projects which compliment national efforts. The work of the Publications Committee is concentrating upon the production of EMP News and the fostering of EFOMP input to PMB and CPPM.

Liaison with other Scientific Organisations

Developments have been reported in this and previous issues of EMP News. The President reported upon the details to Council.

EFOMP Symposium—Hamburg 1982

The Role, Status and Responsibilities of the Clinical Radiation Physicist

The World Congress on Medical Physics and Bioengineering at Hamburg provided an opportunity for the first large scale meeting of EFOMP members and other interested parties. The meeting began with a welcome from D. Harder, who complimented EFOMP for tackling a difficult set of subjects within the symposium. John Clifton then provided a brief history of EFOMP. The discussion papers, which were published in the last issue of EMP News, were then introduced in turn and discussed.

Discussion of the first paper, on 'Scientific Responsibilities' and introduced by Auguste Piron, quickly led to wide ranging issues, in particular a consideration of physicists not concerned with ionising radiation. It was pointed out that the topic had been confined in scope in a manner which reflected the present activity of the majority of EFOMP members. Relationships with doctors and industrial colleagues were discussed and the session provided a valuable opportunity for the audience to become aquainted with the general ideas and constitution of EFOMP. Pleas were made for it to be clearly understood that research activity should form a defined part of the clinical physicists' activity. In pursuing the recognition of our role the links with organisations within Europe such as EAR and ESTRO are typical of the constructive initiatives that EFOMP can take.

The paper on 'Education and Training', introduced by Alex Kaul, produced a request that the university sector should be fully recognised and allowed to play its part. In particular there was felt to be a need to encourage travel in order to use existing courses as fully as possible. Suggestions of funding from international sources for exchange and for the funding of meetings were made and the problems of East/West exchange alluded to. Colleagues from America indicated that they face many similar problems to those in Europe, in education and training and suggested that exchange schemes which spanned that Atlantic might usefully be considered as well as schemes within Europe.

Inevitable the forum again widened because the venue was one in which IOMP and IFMBE were sharing. Thus clinical engineers were well represented and Colin Roberts explained the parallel path towards recognised training that the bioengineers were seeking to follow. In this case the concept is international from the start and the subject had been well aired in the main congress. Alex Kaul suggested that much needed to be done at national level to improve liaison between clinical physicists and clinical engineers. There was further discussion on the practicalities of training – how course modules might be linked to conferences etc. Finally a case was put for a formal framework to specify the training structure but leave the national groups the ability to establish their own details, rather than for the publication of general syllabuses.

The paper on 'Professional Matters', introduced by Pele Asard, provoked much discussion. Registration proved to be a worry to several nations, who felt that it would stifle scientific staff movement and free recruitment. However registration is being actively pursued in some quarters and it was suggested that some form of voluntary registration might forestall legislative control.

In summary it was accepted that efforts to enhance the status of clinical physicists with governments, medical colleagues and the public at large would be helped by the activities of EFOMP. The national organisations were asked to comment to Council upon the discussion documents. The scientific, education and professional committees were asked to incorporate these comments and to work on definitive policy statements.

E. Claridge

Roving Reports

World Congress on Medical Physics and Biomedical Engineering, Hamburg, September 1982.

This was the 13th International Conference on Medical and Biological Engineering and the 6th International Conference on Medical Physics held in the Congress Centrum, Hamburg. The conference covered everything of interest to physical scientists: the latest in radiation protection, nuclear medicine instrumentation and methods, digital radiology, old-fashioned analogue radiology and even a fireside talk in ethics – without the fire.

Again, parallel sessions were unfortunately non-parallel, which spoilt it for the liberal minded physical scientist who wanted to mix gamma cameras with biomaterials and aspects of radiation

protection with aids for the handicapped. The standard of the papers I found varied between outstanding and less than mediocre. The review papers by invited speakers were consistently of a very high standard, I found them extremely valuable for updating and clarifying the 'state of the art'.

Poster sessions were well attended by both presenters and delegates. This I found was a valuable contribution as interesting and worthwhile discussions could take place between the enthusiastic poster authors and passing delegates who, at first, thought they had only a small interest in an unfamiliar topic but, on closer examination, widened their knowledge and appreciation of new fields. I was greatly heartened to see that it was a truly international conference, members from Eastern block countries gave papers on their facilities and techniques – their problems seemed remarkably like our problems. Far Eastern countries were well represented; even a couple of Irish turned up! Of course, the Americans were well represented and it was marvellous to see many old friends. The extensive proceedings were very well put together and I hope they will be available to people who could not make the meeting.

Anything new to report? The NMR session was well attended, not only imaging but also in vivo analysis of complex biochemistry was presented – very exciting. Over-view lectures on diagnostic imaging given by Dr. Budinger, together with instrumentation updates by Dr. Muehllehner, were first-rate. Details concerning signal processing and physiological transducers and also new imaging techniques, including a comprehensive catalogue of digital radiology applications, gave delegates valuable up-to-date information on these techniques.

Our German hosts were magnificant in their generosity, kindness and, of course, their organising capability. I carelessly lost my camera in the Congress Centre; when I made enquiries I was escorted to the lost property office, a list was consulted, the camera found and returned with a warning that many foreigners visit the Centre and I should be more careful in future! What more can be said!

D.J. Dowsett

Physical Aspects of Total Body Irradiation

The dosimetry methods of irradiation techniques for total body irradiation, as practiced in 28 European hospitals, have been discussed at a workshop organized by EULEP and EBMT, held at Leiden on May 26 and 27, 1982. The proceedings of this meeting will appear in an issue of 'Journal Européen de Radiothérapie' (December 1982). The radiobiological and clinical aspects of total body irradiation, the experience with total body irradiation outside Europe and the measurements of lung dose will be summarized in separate presentations.

This issue of the 'Journal Européen de Radiothérapie' also contains a short description of the dosimetry procedures applied by the 22 European groups who have already treated five or more patients. These short reports are meant to allow for a comparison of the physical conditions of the treatments performed at the different clinics. It is anticipated that these summaries can assist in improving the techniques locally applied at present. A very lively and useful discussion was initiated about the following six aspects which are of primary concern for total body irradiation:

- patient position and beam direction,
- multiple parallel beams (biological problems – hot spots in critical organs),
- homogeneity of dose distribution,
- lung shielding,
- delivery of dose to the patient (including beam monitoring),
- in vivo dosimetry.

The discussion of these different aspects, as summarized by scientific secretaries, are included in this issue. The workshop was concluded with a round table discussion on a number of aspects including:

- chamber calibration and dosimetry intercomparisons,
- choice of phantom material, geometry and dimensions of phantom,
- need for measurements at SSD actually employed,
- need for dose profiles at a relevant depth in the phantom,
- the statement of the relevant dose value,
- doses received by head and legs,
- effect of shielding on lung dose,
- recommendations for in vivo dosimetry.

The main conclusions of the round table discussion are also included.

Enquiries to Mr. Leplus, SPPIF, MASSON – Zone industrielle 41350 VINEUIL, France.

The World Federation for Ultrasound in Medicine & Biology, Brighton, UK. – July 1982

This was the Third meeting of the World Federation and the Fifth World Congress this year held in sunny Brighton, a delightful seaside town made famous in Regency times. The 5 days of the meeting covered a diversity of topics, indicating that ultrasound is still performing a valuable contribution to diagnostic medicine.

The topics covered were: Cardiology (69 papers), Obstetrics (66), Tissue Characterization (35), Doppler & Breast Ultrasound (27 papers each), Opthalmology (26), Renal Tract (20), Neurosonography (9) and Pancreas (8). The number of papers involved gave a rough indication of importance. There were sessions on Instrumentation and Hazards. An extensive commercial contribution completed this comprehensive meeting. The important areas of obstetrics and mammosonography were well presented. These, of course, are the areas where ultrasound has a heavy commitment. Small Part Scanning, i.e. testes, is also occupying an important position (double entendre intended).

Interesting points were raised describing legal complications in the USA where, with 60 prosecution cases, 22 of them were due to missed diagnosis (36%!), this information coupled with another paper on training schedules for ultrasonographers made it quite clear that the reputation of ultrasound as an imaging technique depends very largely on maintaining the highest standards in training.

The full Proceedings are published in 'Ultrasound in Medicine & Biology' Volume 8, 1982 as a supplement.

M. Behan

World Federation of Nuclear Medicine and Biology – Paris, 1982

The Third Congress of Nuclear Medicine and Biology took place this year in the Palais des Congrès in Paris. This sumptuous rendezvous provided an ideal, if somewhat expensive, meeting place for everyone who was anyone in clinical nuclear medicine. Approaching 3,000 delegates attended and the many parallel sessions over the four day period satisfied all specialities. Session topics ranged from Emission Tomography, Information Processing, Oncology, Radiochemistry, Haematology, in vivo analytical techniques, imaging procedures, RIA, monoclonal antibodies, nuclear magnetic resonance, paediatric nuclear medicine and every organ imaging technique that one could imagine. The meeting, in fact, overflowed into a further two days of post-congress meetings which covered workshops on specific applications.

Meetings of this size pose vast organisational problems; 250 people took part in the organisation of this Third Congress:– scientific, statute and industrial liaison committees, editors, reviewers, reviewer groups, international advisory councils, correspondents and benefactors. In the face of this impressive organisation may I offer one comment? Such a crowded and important meeting relies entirely on well planned parallel sessions if the maximum amount of information is to be given. Parallel sessions, if they are to be successful, must work to a rigid timetable so that delegates can hop from room to room, and so, take in all that is important to them, getting maximum benefit for their large financial outlay. Unfortunately, in the sessions that I attended, this was not the case. Chairmen allowed speakers to overstay their time, involved questions extended this time further so that it became impossible to change from one room to another, and so, spend one's time effectively. In parallel sessions a chairman's responsibility is to his audience, he must keep to an accurate timetable and save up questions to the end so that the main presentations are not disrupted. In this way the extensive organisation and financial outlay of the organising body and delegates is not wasted.

In spite of this annoying fault, I found the meeting to be one of the most valuable I have attended for a long while. The proceedings are vast, consisting of five volumes and covering all the talks and posters; unlike most symposium proceedings, I find that I am constantly referring to them. I notice, incidentally, that Pergamon Press are offering them for sale; they are expensive ($500) but all clinicians and scientists in nuclear medicine will find that they are a significant source of information.

Were there any pointers concerning future trends at the meeting? Will nuclear medicine hold its own against the new competition of NMR, having already lost ground to C-T? Doubtless, NMR will supercede a few nuclear medicine procedures, but seemingly the great drawback with NMR is its long data acquisition time

for good quality images that in practice limits its use; it's fine for brain sections and muscle sections of the limb, but, when used for thorax or even abdominal sections, patient movement during minutes of data collection time seriously limits its resolution; a great disappointment for those clinicians hoping for radiationless high resolution mammography. With the advent of sodium and phosphate imaging in the NMR the future may be very exciting; who knows perhaps we may be able to image psychiatric disease – phosphorous distribution revealing brain conduction pathways which would lead to the quantitation of cerebral normality!! Quelle horreur!

Back in the nuclear medicine field it is quite clear that blood cell and anti-body labelling promises a whole new frontier where important, clinically relevant advances will be made. Again, nuclear medicine will offer that important commodity, functional imaging, which is missing in other imaging techniques. Sections in the Paris programme dealing with emission tomography, data manipulation of cardiac information and imaging procedures in general produced nothing new, although many invited speakers provided a valuable update in the various specialities. The field of radioimmunoassy is entering a new phase of expansion and may well be re-named in the near future according to Dr. Ekins. Very short lived isotopes were not as promising as first impressions suggested, both Iridium 191m and Gold 195m are not yet convincing as useful additions to clinical nuclear medicine. The commercial exhibition was first rate and the scientific sessions supported by various companies were mostly of very high standard.

Paris really is a marvellous holiday city – when my parallel sessions twisted and converged I took time off and visited the Impressionist Gallery at the Jeu de Paume. I wonder what Manet, Cezanne and van Gogh would have thought of R.O.C. curves; would deconvolution have done anything for the impressionist images?

D.J. Dowsett

Practical considerations on Technology Assessment

The practical activities of physics and engineering applied to medicine can be summarised and divided into at least three main groups. The first group of activities involve field measurements on equipment which emits ionising or non ionising radiation. Thus it includes equipment emitting gamma-rays, X-rays, ultrasound and microwaves. In some cases laws or rules are laid down concerning exposure limits and protection so as to reduce the risk to both workers and patients. In some applications there are no rules and a lot of work must be put into trying to standardise measurements and methods in order to lay down practical guidelines of behaviour.

Secondly quality control and maintenance of equipment includes all those tasks required to check equipment and optimise its use. Nowadays some equipment is so sophisticated, often involving computer equipment, that technical backing is clearly required. Practical experience shows that even relatively simple equipment needs technical support. Collaboration between medical and technical staff should start when the department needs a particular piece of equipment and wants to choose the most suitable, taking into account technical and economic parameters. The equipment history can be summarised:– Selection, running-in, routine use, maintenance, breakdown repair and eventual replacement. To respond to all these considerations requires up to date knowledge of equipment function, equipment application, legislation and guidelines. From our experience it is necessary to prepare and use a maintenance chart for each piece of equipment and to keep it up to date so as to show details of all interventions and modifications. From the incidence of functional defects it will be possible to evaluate the status of the equipment in order to facilitate programmed replacement.

The third point of action is data analysis and elaboration. This includes everything concerning medical data analysis, i.e. statistical analysis, pattern analysis etc. I do not need to go deeply into detail because everyone involved will know how important it is to apply statistical methods correctly in the evaluation of follow-up on patients. Sometimes the statistical approach to this kind of problem is the only one possible. On the other hand, pattern analysis and signal processing may be used as the final part of a very sophisticated, automated process. Sometimes it is possible to reach a complete pattern recognition and classification, sometimes only to collect quantitative values. The first case means a computerised diagnosis which may be independent from doctors, the second provides doctors with more data from which to formulate a diagnosis. The background, the development and the level achieved nowadays are well known. The best results have been reached in the fields of ECG and EEG analysis. Advantages and disadvantages must be evaluated.

Of course the subdivision into these three groups: Field measurement, Quality control and maintenance, Data analysis and elaboration is only a broad generalisation. Let us stop to ask ourselves what are the most important problems concerning technical applications in medicine. To give one example – what considerations should be applied to the safety of equipment? What about the question of safety in operating theatres? Everybody knows how difficult it is in practice to solve this kind of problem and how much work is involved. Safety control is of prime importance but who must check the equipment, a physicist or a bioengineer? The most important thing is for the task to be done well and so to provide doctors and patients with absolute safety. In order to solve the problem we must consider working together; only practical activity involving physicists, engineers and other staff can bring about the level of technical support which will lead to a satisfactory result. This does not mean leaving everything to chance but organising oneself as well as possible with regard to the general situation, the possibilities and the aims. Safety in operating theatres is just one example, it would be possible to give many others.

What can general organisations at National, European and World levels do? Besides the important work of scientific exchange they can support physicists, engineers etc. with professional and technical guidelines. EFOMP is starting in this field as a federation of national organisations but of course much support can already be provided by the W.H.O. Considering costs we should take into account that in industrial countries for which data is available health costs over the last 20 years have increased more than any other item in the Gross National Products (GNP). Between 1960 and 1978, in the European Community, the percentage of GNP allocated to health costs has gone up from 4.1% to 7.3%. The biggest proportional increase has taken place in West Germany, where it has increased by 10%. In Italy the increase was in line with the average for the EEC until 1977 and then a decrease took place. The U.K. and France appear to have more or less stabilised their allocation for health, while West Germany, the USA, Sweden and Holland have increased their allocation with a ratio higher than the increase of GNP. Has the proportional increase in biomedical equipment and in general applied science induced proportional benefits? Different proposals have been formalised to solve the problem of health comparability with the national economy. Those which in my opinion must be followed are those suggested by the W.H.O., summarised in the document Alme-Ate. It is based on the proposal of a kind of social agreement between governments, populations and the W.H.O. in order to ensure a health service for everyone in the near future. The strategy is to ensure a National Health Service depending on actual needs, with absolute priority to collective problems to create the base for assistance and prevention. Of course all National Health Services must develop in accordance with political and social situations. Analysis and research has usually involved the participation of economists. From these studies one of the most important considerations is that it is no longer possible to develop without limit certain branches of sanitary services, as some authorities would wish. Likewise the level of equipment and biomedical aids must be proportioned to viable possibilities and actual requirements within the structure.

The W.H.O. has invited developed countries to think of their expensive National Health Service costs again and the present economic crisis could be a good opportunity to do this. On the other hand it is important to concentrate efforts on the optimisation of the existing system through better organisation, better distribution and quality control. The meeting recently held in Budapest on 'The Organisation of a Health Technology Assessment Network in the European Region' and others to be held on 'Quality Control in Diagnostic Radiology' seek to pursue these objectives. Experience in this field has been gained in the USA, for example, with the constitution of special bodies responsible for keeping standards up to date, to control the outflow of resources and to guarantee the quality of assistance.

In my opinion the term 'Technology Assessment' must become integrated into Health Policy. It is very important to discuss the role of experimentation and the evolving situation as the methodology of the new field of Technology Assessment develops. My conclusion is that those of us who work in the practical health structures should be active in both applied research and in Technology Assessment.

Anna Benini
Secretary General, EFOMP

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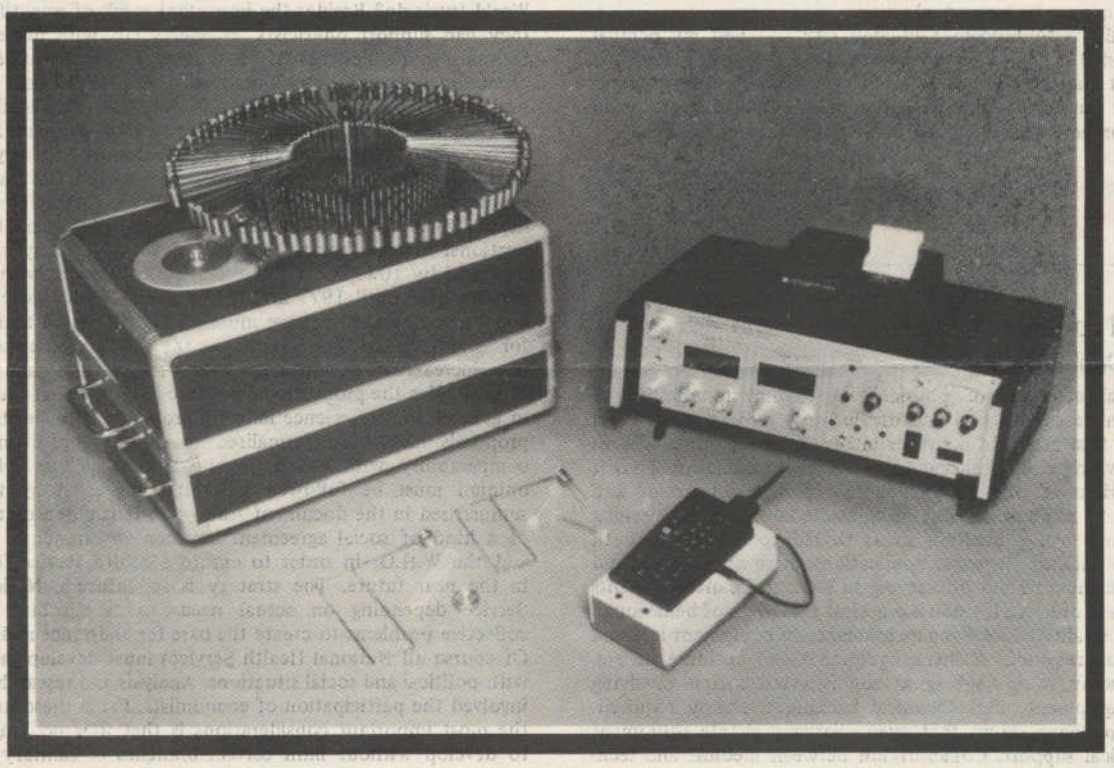

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A Low-Cost Gamma Counter for Unfavourable Environments

By Robert A. Dudley, IAEA.

One barrier to the effective medical use of radionuclides in developing countries is the unavailability of suitable radiation measurement instruments. A wish list on instrument characteristics might look as follows: (1) Low cost – financing is scarce, and duplication of instruments as insurance against breakdown is desirable. (2) Robustness – environmental conditions may be severe, and repair slow. (3) Graceful degradation – manual functions should be preserved even if automatic features fail. (4) Accessibility of spare parts and service – to avoid customs and currency problems, parts and service should be available within national boundaries. (5) Invulnerability to disturbances in electrical mains power – voltage fluctuations and power failures may be frequent. (6) Simplicity of operation – operators may have limited specialized experience. (7) Provision of quality assurance in measurements – in view of the above threats, the integrity of the measurement process should be frequently checked. (8) Versatility – limitations on financing and maintenance make undesirable the acquisition of diverse specialized instruments.

The Medical Applications Section and the Laboratory of the International Atomic Energy Agency have attempted to develop an automatic well scintillation counter to such specifications. A commercial version of the counter is offered by Oakfield Instruments, Ltd., Eynsham, England, and it is hoped that some national atomic energy laboratories might be able to construct similar instruments to meet local needs.

One key idea in the design concept has been to incorporate in the instrument, where possible, products developed for a mass consumer market; these would benefit both from economies of scale and from a world-wide dissemination of maintenance services. In its present form the instrument consists of 3 parts: (1) a sample changer based upon a Kodak Carousel projector for 35 mm slides, (2) a data-processor and system controller consisting of a Hewlett-Packard HP-41CV programmable calculator, and (3) a NaI(T1) detector and counter with interfaces to the other 2 components. The first 2 elements are consumer products, while the last, which is not, can at least be optimized with respect to the wish list.

The Kodak projector itself is unmodified except for absence of lenses. To complete the mechanics of a functioning sample changer, it has been necessary to add sample holders, a passive device to guide the insertion of the samples into the detector well, and a base plate for mounting the projector adjacent to the detector. The sample holders are wire frames that suspend the counting vials outboard from the carousel. One set provides for 80 counting vials of dimensions 75 mm x 12 mm, while another provides for 40 vials of dimensions 100 mm x 16 mm. The latter vials can also carry tubes of smaller dimensions, thereby accommodating the diverse sizes that may be found in radioimmunoassay kits.

The counter itself, in the commercial version, consists of a 50 mm x 50 mm. NaI(T1) crystal, HV supply, 2 single channel analyzers and scalers, a ratemeter, and an interface to sample changer and calculator. Power is supplied from mains via an internal battery, which buffers out voltage fluctuations and spikes, and indeed permits manual operation of the counter throughout a power failure of a few hours' duration. In automatic operation, the interface transmits the number of counts accumulated in each 20 second counting interval to the calculator, and when the calculator signals that the measurement on a particular sample is concluded, activates the sample changer in order that it substitute the next sample. If power fails during automatic operation, the interface prevents disruption of the measurement series by demanding the next change of sample, and continuing counting, only after power returns.

The calculator system includes, in addition to the calculator itself, a printer-plotter and a magnetic card reader – all powered by rechargeable batteries. It is capable of receiving on-line input of counting data from the counter and, under program control, signalling the counter when a sample change is required. The calculator may be programmed to supervise sample measurement time according to any desired criteria – preset time, preset counts, preset counting error, or some combination of these. Similarly, it may be programmed to process the accumulated data while counting progresses, and to print or plot the results. Several data analysis programs have been prepared, including one for radioimmunoassay that is quite ambitious. The latter provides a more critical inspection of assay integrity than do any commercial programs known to us, including automatic generation of response-error relationships and precision profiles. When the counter is not in use, the calculator is available for any other laboratory task, for which special programs may easily be entered through the card reader.

About 20 of these counters, in one or another of their successive versions, are in use, with generally encouraging results. They do well with respect to most attributes on the wish list; however, careful alignment during assembly (a one-time operation) is essential to assure faultless sample changing, and operation is no simpler than in the case of conventional counters. The present RIA programs may be ahead of their time, in that users are not (yet) accustomed to inspect their results so critically, and often do not fully exploit the deduced quality control information. In summary, the experience to date suggests that such counters offer certain distinct advantages over conventional counters, especially where the electrical power supply is unreliable, and are worthy competitors in laboratories that have a modest workload.

Meetings Diary

13-15 April, Brighton, England.
Annual Computing Conference – Data Aquisition and Analysis.
HPA, 47, Belgrave Square, London, SW1X 8QX, England.

15-16 April, Liege, Belgium.
2nd International Symposium: Fundamentals of Technical Progress in Medicine.
Dr. Sc. J. Garsou, Service de Radiothérapie, Hôpital Universitaire de Bavière, Boulevard de la Constitution 66, B-4020 Liege, Belgium.

22-24 June, Rotterdam, The Netherlands.
5th Symposium on Echocardiology.
Mr. H. Rijsterborgh, Erasmus University, Ee 2302a, PO Box 1738, 3000 DR Rotterdam, The Netherlands.

5-10 September, Bordeaux, France.
Fifth European Congress on Radiology.
Mme. N. Hargous, Hopital Pellegrin, Service de Radiologie, Place Amelie Raba-Leon, F-33076 Bordeaux, France.

3-5 October, Capri, Italy.
International Seminar on Indoor Exposure to Natural Radiation and Related Risk Assessment.
Symposium Secretariat, Commission of the European Comm, Dr. J. Sinnaeve, (DG XII/F/1), 200 Rue de la Loi, B-1049 Brussels, Belgium.

24-27 October, Vienna, Austria.
Seminar on Transport of Radioactive Materials by Post.
IAEA-SR-83, PO Box, Vienna International Centre, A-1400 Vienna, Austria.

Please send material for the June 1983 issue of E.M.P. News, by 1st May 1983 to:–
Mr. D.J. Dowsett, Honorary Secretary of EFOMP Publications Committee, Radiological Department, Mater Misericordiae Hospital, Dublin 7, Ireland,
or to Dr. E. Claridge, Editor E.M.P. News, Department of Medical Physics and Biomedical Engineering, Queen Elizabeth Hospital, Birmingham, B15 2TH, England.

General correspondence concerning the Federation should be addressed to the Secretary-General, Dr. A. Benini, Ospedali di Parma, Servizio di Fisica Sanitaria, 43100 Parma, Italy.

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