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HOSPITAL PHYSICS

Report to the Government of Lebanon

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الجمهورية اللبنانية
مكتب وزير الدولة لشؤون التنمية الإدارية
مركز مشاريع ودراسات القطاع العام

HOSPITAL PHYSICS

REPORT TO THE GOVERNMENT OF LEBANON

by

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IAEA EXPERT

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INTRODUCTION

This report is divided, broadly, into three main sections:

1. RADIOTHERAPY
2. RADIATION PROTECTION
3. GENERAL

The first two sections cover the major duties carried out during my assignment. The final section ("GENERAL") is further divided into several sub-sections to include minor activities in which I was invited to participate.

1. RADIOTHERAPY

There are four centres for Radiotherapy in Lebanon, three of these in Beirut:

(a) American University of Beirut Hospital (hereafter referred to as the A.U.B. Hospital).

(b) Institut de Radiologie et de Lutte Contre le Cancer at the French Hospital Hôtel Dieu (hereafter referred to as Inst. Radiol.).

(c) Professor Greineder's German Hospital.

(d) Dr. Abdul Kader Odra's Hospital.

There are two further hospitals which will be developing radiotherapy departments:

(e) The St. George's Hospital, and

(f) The Baabda Hospital.

These will be discussed in Section 3 ("GENERAL") of this report.

(a) and (b) The A.U.B. Hospital and Inst. Radiol.

The Radiotherapy Departments of both these institutions form a part of the Radiology Departments under the Chairmanship of Radiologists. These Chairmen are Dr. S. Morton at the A.U.B. Hospital and Professor Ponthus at the Inst. Radiol.

whatsoever was available regarding the quality of the radiation or even the accuracy of the meters (reading kV & mA),and also as the units could only be operated for limited periods due to overheating. The result was that considerable time was spent on this undertaking, resulting in the completion of:

(i) A complete set of quality measurements for a range of beam filtrations.

(ii) Calibration of a dosemeter for each of these qualities.

(iii) Measurement of output for each set of radiation conditions.

A full report on this was submitted to the Dermatologists and a copy deposited with the U.N. Resident Representative in Beirut.

(c) Professor Greineder's German Hospital

I only discovered this institution as one having Radiotherapy facilities towards the end of my assignment, during my visits to hospitals for the purpose of studying the standard of radiation protection in Lebanese Medical Institutions. It was, consequently, too late for me to be able to offer any Medical Physics assistance. This Institution is, however, primarily concerned with Diagnostic Radiology - very little Radiotherapy being practiced. I was told that only 15 to 20 new patients were treated per year. This treatment is carried out using the only therapy unit installed there - a Maximer 220 kV machine which is used over a range of voltages from 90 to 180 kV. Calibrations are carried out only once a year (which I feel is inadequate) using a Hamar Dosemeter which has been in use since 1948. The impression I obtained in this regard was that a single correction factor was adopted for all radiation qualities. This energy independence is not likely and, unless I was incorrectly informed, I feel that the dosemeter concerned should be recalibrated by a competent calibrating authority, and some technique of routinely checking its performance adopted.

(d) Dr. Abdul Kader Odra's Hospital

As in the case of Professor Greineder's Hospital, the existence of Radiotherapy facilities at this institution was discovered during my tour of hospitals in North Lebanon, and this occurred too late for me to be able to offer any Medical Physics assistance.

There are two units used for Radiation Therapy:

(a) A contact therapy unit which is used only occasionally. In order to check calibrations I was told that a Philips' representative was called in once a year for this purpose.

radiation protection. Dr. Anouti expressed his keen anxiety to remedy this situation and I accordingly decided to visit as many installations as possible to examine the conditions under which X-radiation was used throughout Lebanon. It was realised at the outset that a complete radiation survey would not be possible in the time available and that even if each visit was very brief, I would probably not be able to include all the institutions in the country.

I decided that probably the best approach to the problem of trying to obtain some sort of assessment of the prevailing conditions and at the same time to cover as many institutions as possible, was to prepare, as a basis of discussion, a short list of salient points relating to the diagnostic use of X-radiation. This list covered the following:

1. The number of units installed and the maximum values of kV and mA of each.
2. Existence of control cubicles and protection thereof.
3. Availability of lead aprons for staff.
4. Whether or not gonadal protection is used for protection of patients.
5. Whether or not beam limitation is adequate during screening procedures - especially for under-couch tubes.
6. Whether or not lead rubber protection is present around fluorescent screens.
7. Whether or not screening procedures are preceded by dark adaption of the eyes.
8. Whether or not the installation is such that the maximum possible radiation field is always smaller than the fluorescent screen.
9. Maximum screening current used.
10. What, if any, are the limitations placed on radiographic examinations of pregnant women.
11. Total filtration of diagnostic radiation beams.
12. Protective barriers on walls of diagnostic rooms.
13. The number of personnel exposed to radiation.
14. Reaction to the establishment of a National Film Badge Protection Service.

The replies of most persons to the last question was that such a service was very necessary and long overdue, and would be strongly supported. It must be pointed out, however, that most in-

No. of institutions using gonadal protection for patients	10
No. of institutions not using gonadal protection for patients	62
Screens protected by lead rubber	28
Screens not protected by lead rubber	39
Screening field adequately limited to be smaller than screen	46
Screening field not limited to be smaller than screen	17
Dark adaption of eyes before screening	44
No dark adaption of eyes before screening	18
Screening current less than 4 mA	25
Screening current 4 mA or greater	21
No knowledge of screening current	27
Limitation of procedures in pregnancy adequate	62
Limitation of procedures in pregnancy doubtful	6
Added beam filtration 2 mm Al or more	12
Added beam filtration less than 2 mm Al	26
No knowledge of added beam filtration	43
Lead protection on walls	9
No lead protection on walls	68
No. of personnel working with radiation	281

A detailed report of each institution has been submitted to the Ministry of Health in Lebanon.

The survey showed that there is an urgent need to improve the radiation protection at many X-ray installations in Lebanon. It is hoped that suggestions and recommendations which I made at each institution will be followed as much as possible. The use of added filtration and beam limitation techniques (cones and diaphragms) are most important for reducing doses received by patients and operators. It is also important to have all operators fully trained both in techniques and radiation protection. Furthermore it is essential to support good radiographic practices with adequate dark room facilities.

The International Commission on Radiological Protection has issued recommendations in connection with X-ray facilities, X-ray equipment and operating conditions. As these have formed the basis

A step in this direction - i.e. in conducting a formal course of training - has been taken by the A.U.B. Hospital. I understand that the course extends over only 1 year and this, of course, necessarily limits the syllabus of each subject taught. On the other hand the standard may possibly be necessarily limited by virtue of the educational standards of the students. I mention this because I gave a few lectures to this group of students (after they had passed their qualifying examinations) on a few elementary aspects of Radiation Physics dealing with dosimetry, and although they were all intensely interested and keen, (and even asked me to give them more lectures), by and large they experienced considerable difficulty in following and understanding the principles involved. I have discussed this aspect of relative standard with many persons and it would appear that the general feeling is that higher standards cannot be achieved until something is done to raise the minimum educational standard demanded above that of the candidates currently presenting themselves for training in this field. Without wishing to become involved in internal policies or politics, I think it is relevant to state here that the general concensus of opinion among the medical persons concerned (and with whom I discussed these aspects) is that the salaries offered to Radiographers is not sufficiently attractive to draw the interest of candidates holding better school leaving certificates. If this is in fact so, it might be of considerable advantage if the Ministry of Health were to set up a commission of enquiry to investigate this question and if necessary to recommend better minimum salaries so as to attract a higher educational standard of candidate. By this means higher Radiographic Standards could be achieved to the general betterment of all aspects of Radiation work in Lebanon.

It is, I feel, a great pity that the course offered by the A.U.B. Hospital seems to be limited to Diagnostic Radiographic training because the needs of the Therapeutic Radiographer is certainly just as great and probably more so in certain aspects such as Radiation Physics.

Whatever my criticisms, the A.U.B. Hospital is making a magnificent effort and is to be highly commended for the initiative it has taken in raising the standard of Radiography in Lebanon.

I feel confident that by raising the standard of general Radiographic training in Lebanon, people concerned with duties (be they research, diagnostic or therapeutic procedures) involving the use of ionizing radiations will become more conscious of internationally accepted standards of Radiation Protection. As a result of this further enlightment, the more unfortunate aspects revealed in the analysis (which admittedly is far from complete) must be greatly reduced.

LEGISLATION IN LEBANON

Finally, Dr. Anouti asked me to prepare, in conjunction with Père Dupré la Tour a preliminary draft of a proposed legislation by means of which users of ionizing radiations could be compelled to comply with approved codes of practice; and by means of which institutions concerned could be subjected to inspections by suitably qualified persons in order to determine whether or not they do comply with the regulations.

Unfortunately, unforeseen circumstances prevented me from preparing this document. However, as soon as time permits I shall attempt to draft a scheme which may be of value to the Lebanese Government, and shall communicate directly with Dr. Anouti on this subject.

3. GENERAL

A. Development of New Departments

Dr. E. Wakil, Director of Medical Care, informed me that among the developments projected for the new Baabda Hospital (construction of which had been started) it was hoped to include Radiation facilities. He invited me to study the proposed plans and to take part in consultations with the Government architect, Mr. Jurdak. I had many meetings with Mr. Jurdak on this project and at these he made notes of many recommendations I made to him verbally. Principal among these was the fact that no provision had been made for the inclusion of Medical Physics facilities, and that although no Medical Physics as such was being practiced in Lebanon at the time, I felt it would be wise to make allowance for such a development - particularly as there was a projected scheme to develop a National Anti-Cancer Centre in Lebanon (see sub-section B following). I also suggested certain changes in the relative positions of some of the rooms in the Radiotherapy Department to allow for future development of procedures involving radioactive isotopes.

As Mr. Jurdak is also the architect responsible for the design of the New St. Georges Hospital (Institution 49 in the Appendix A list) I was invited to study these plans also and to take part in consultations. Construction on the new hospital had already started and separate Radiotherapy and Radiology Departments included. Unfortunately no provision had been made at all for Medical Physics services, and suggested changes in space allocation were discussed to remedy this. These talks were followed by further discussions with Dr. Richard Saliba on the site and during these the reasons for my suggestions were explained to him. What decisions were finally agreed upon by the authorities concerned I do not know as these were probably taken after my departure from Lebanon.

quality measurements, ionization chamber calibrations and calibrations of X-ray outputs. Also, he assisted me in doing checks on the correspondence of diaphragm dial settings and gamma fields for the telecurie Co-60 unit at the A.U.B. Hospital using the technique of beam traverse with an ionization chamber. He further assisted me in carrying out checks of light field correspondence with gamma ray field in the telecurie Co-60 unit in the Radiotherapy Department of the Institut de Radiologie et de Lutte Contre le Cancer using a photographic technique. In this latter task he prepared a report (which I countersigned) which was delivered to the radiotherapist Dr. N. Ghossein.

D. Introductory Course in Radiological Physics

The Lebanese Government kindly agreed to release me at the request of the International Atomic Energy Agency for a period of two weeks, to take part as a guest lecturer at the above course held in Istanbul, Turkey. Although the persons attending this course comprised a selected group of physicists, radiotherapists and biologists, there was a considerable language difficulty and this necessitated delivering the lectures via an interpreter. My interpreter was a physicist from the Turkish Nuclear Reactor group and I must express my thanks at the strong co-operation which he accorded me. In view of this language difficulty I was asked, shortly after the commencement of the course, if I would prepare roneod notes for distribution to the class. This took considerable time, as I had not been prepared for this request, and resulted in a detailed set of notes being distributed to all.

In conclusion I must express my gratitude to Dr. Jamil Anouti, Director General of Public Health, to members of his staff and to all the Lebanese people with whom I had dealings, for the kind way in which I, as a foreigner, was received into their country.

In particular I would like to thank Père Dupré la Tour, Dr. Morton, Dr. P. Issa and Dr. N. Ghossein for the strong co-operation they accorded me, and for their unstinted hospitality.

36.	Greineder (German Hospital) (Radiologist)	Ras Beirut	
37.	Ras Beirut Hospital		
+38.	Albert Zebouny	Damascus Road, Ashrafieh	9
+39.	Joseph Arbid (Gynaecologist)	Daoud Amoun St.	40
40.	Wadih Aoun (Gynaecologist and General Surgeon)	Homsy Bldg. Damascus Road	25
41.	Ely Prince	Sioufi St.	25
+42.	Abdul Rachman Lobban		
43.	Antoine Said	Sofa Bldg. Hôtel Dieu St.	15
44.	George Badr	Avenue des Français, Ain El Meraisseh	45
+45.	Esbir Yazgy	Hamra St., Ras Beirut	12
+46.	Fouad Khalife	Omar Bin Khattab St.	12
+47.	Abdel Rahman Sinno	Takouch & Labban Bldg. Virouan	12
+48.	Mahommed Ali Ahmed	Acr & Hayat Bldg. Hamra St.	13
49.	St. Georges (Greek Orthodox)	Ashrafeih	80
+50.	Wargan Sahakian	Berhan Sbaro Bldg. Spears St.	11
+51.	Nagib Karanouh	Kabbany Bldg. Ardaty St., Ras Beirut	9
+52.	Edde & Mearbes (Maternity)	Koronfel St.	15
53.	George Bikhazi	Ras Beirut	24
+54.	Eli Karam & Malek Badr-El Din	Mahommed Hout St.	15
55.	Bissart	Daouk Bldg. Ras Beirut	10
56.	Sader & Zakaria (Union Hospital) (Urologist)	Abdel Aziz St. Ras Beirut	
57.	Mujais (Lebanese Radiology Clinic)	" " " "	
58.	Hôtel Dieu	Ashrafieh Beirut	199
+59.	St. Charles Borromée	Beirut	65
60.	A.U.B. Hospital	Ras Beirut	209
+61.	Sacré Coeur	Al Bashoura, Beirut	140
+62.	Maternité Française	Toubiyeh	84

I understand that there is also a military hospital in Beirut having X-ray facilities - but this was not visited.

B BEKAA

63.	Hassan Zahmoul	Zahleh	
64.	Taanayel Dispensary	"	
65.	Tell Chihha	"	55
66.	Zahleh	"	100
67.	Ablah Military Hospital		

Dr. Rizh informed me that there are two further hospitals rented by the Government: (a) At Rachaya and (b) At Hermel - but these two do not have any X-ray facilities. He also informed me that

104.	Abdul Kader Adra		
105.	Ramzi Adra		
106.	National Hospital		
107.	Casdi Shahal (Thoracic Surgeon)		
108.	Kamal Zodé		
+109.	Hassan Jisr		
110.	Omar Bissar (Surgeon)		
111.	Elias Deeb (Cardiologist)		
112.	Toufic Farah (Cardiologist)		
113.	Husseini Hospital (Surgeon)		
114.	Hussam Moukaddan (Surgeon)		
+115.	Riad Sharany		
116.	Nazih Mazloun		
+117.	Wazih Mazloun		
+118.	Nizar Fattal		
119.	Shouky Barake (Cardiologist)		
120.	Ismael Rafi		
121.	Institut Finge (Radiologist)		
122.	Tripoly Hospital	Tripoly	125
123.	Anti-T.B. Disponsary	Tripoly	
124.	The American Hospital	Al Minaa, Tripoly	100

E MOUNT LEBANON

N.B. None of the following hospitals were visited, owing to lack of time. The following list is as supplied by the Ministry of Health and may not be complete.

125.	Feghali	Aley	10
126.	George Hanna	Aley	10
127.	Fouad Trad	Aley	8
128.	Masah Bhannes	Bhannes	550
129.	Masah Al Zouniyeh	Al Azouniyeh	200
130.	Masah Hamlin	Al Shabaniyeh Hammana	210
131.	Dar Al Nakaha	Ain El Hegl	20
132.	Masah Dahr Al Bashek	Dahr Al Bashek	200
133.	Dar Altaoulid Lelsayedat Merad	Jounieh	26
134.	Saint Michel	Amshit	22
135.	Dar Al Salib	Jel El Dib	576
136.	Dr. Abou Regeily	Bhamdoun Station	8
137.	Shahin Al Saliby	Souk Al Gharb	10
138.	Mar Boulos Hospital	Bourg Hammoud	12
139.	Mar Youssef Hospital	Al Daoura - Beirut	75
140.	Monseigneur Antoine Akl	Hadath	15
141.	Dr. Sobhy Tayara	Al Abadiya	5
142.	Dr. Adrien Mouniyeh	Jdaide	12
143.	Dr. Adrien Mouniyeh	Bourg Hammound	7
144.	Zakhiya Toubia	Amshit	10
145.	Shafik Sinno	Al-Halaliya	8

APPENDIX B

Sections 15-86, Report of Committee III, International Commission on Radiological Protection

C. PLANS FOR INSTALLATIONS USING X-RAYS AND SEALED GAMMA-RAY SOURCES

(15) Plans for new installations using X-rays and sealed gamma-ray sources or for modifications of existing installations involving structural shielding should be reviewed by the appropriate protection organization or a qualified expert before building is commenced.

(16) Protection can be achieved by distance and by protective barriers. Where the cost of protective barriers becomes an important consideration, as, for example, with gamma-ray beam and high-voltage X-ray equipment, the location of the installation with respect to other occupied space may permit economies to be effected. In special cases, the distance involved may be such as to permit the barrier thickness to be reduced to zero. These distances, based on various assumed exposure conditions in the direction of the useful beam, are indicated in Figs. 21 and 22 of the Appendix.

(17) Figures 6 to 19 of the Appendix provide basic absorption data for the computation of protective barrier thicknesses. Examples of barrier thicknesses required are given in Tables IV to VII of the Appendix.

(18) In computing the protection required against the useful beam, a qualified expert should consider whether or not to allow for the attenuation provided by the patient, phantom or other removable objects.

(19) Protection against stray radiation requires smaller barrier thicknesses than would be necessary for the corresponding useful beam. Accordingly, the amount of structural protection required in any instance can be appreciably reduced by using protective tube and source housings and imposing restrictions on the orientation of the useful beam. Data for computing the thicknesses of secondary protective barriers are given in the Appendix.

(20) In the planning of a radiation installation, account should be taken of the expected work-load of the equipment, use factors of the barriers and the occupancy factor of the adjacent areas. Allowance should be made for possible future increases in these factors, such as increase in the output of the machine, modifications in technique and increase in the degree of occupancy of surrounding areas.

(29) The surveyor should study the proposed methods of operation of the equipment and if necessary recommend modifications to minimize radiation hazards. In this connection a study should be made of the personnel monitoring technique.

Area Dose Rate Measurements

(30) In carrying out a radiation survey, it is often useful to make a preliminary investigation by means of a suitable Geiger-Müller, scintillation or ionization instrument. Films or fluorescent screens may be used to localize small defects in the shielding.

(31) Whenever defects are found in the shielding, they shall be eliminated before the installation is put into routine use.

(32) For the final measurements, ionization chambers or other suitable equipment which have a low variation in sensitivity with dose-rate, quality and direction of the radiation should be used.

(33) When required, measurements shall be made outside the controlled area to verify that persons other than the radiation workers are unlikely to receive more than the appropriate maximum permissible dose after allowing for work-load, use factor, occupancy factors and the attenuation afforded by objects in the useful beam.

Report on a Radiation Survey

(34) The results of a survey should be submitted in a formal written report.

(35) The report should include any recommendations required for the modification of the protection, for limitations in operating procedures and for the posting of signs indicating such limitations.

E. RECOMMENDATIONS ON EQUIPMENT AND OPERATING CONDITIONS

X-ray Medical Diagnostic Installations

General Requirements

(36) A diagnostic-type protective tube housing shall be used.

(37) Apertures, cones or shutters which serve to limit the useful beam should afford the same protection as the tube housing.

(38) The permanent total filter should be determined by the

(48) The focus-skin distance should not be less than 45 cm (18 in.) and shall not be less than 30 cm (12 in.)

(49) All couches and stands for fluoroscopy should be provided with an adequate arrangement for protecting the operator and the assistants against scattered radiation, particularly from the patient and the underside of the table top. This may take the form of an "apron" which should be not less than 45 cm (18 in.) wide and 45 cm (18 in.) long and should be made of protective material having a lead equivalent of not less than 0.5 mm. It should be attached to the lower edge of the screen holder when the latter is vertical and to the side when the screen is horizontal. A separate protective apron or fixed shield may be attached to the side rail of the couch for use when the screen is horizontal. The apron may consist of several overlapping parts to facilitate palpation.

(50) Image intensifiers should afford protection at least equivalent to 1.5 mm lead for 100 kV. From 100 to 150 kV an additional lead equivalent of 0.01 mm per kilovolt is required.

(51) The so-called "hand fluoroscope" shall not be used.

(52) Notwithstanding that the X-ray equipment conforms in every respect to the requirements of these recommendations, it is usually necessary during fluoroscopy, to wear protective aprons or coats in order that the maximum permissible doses are not exceeded. In all normal fluoroscopic work the lead equivalent of protective clothing should not be less than 0.25 mm.

(53) Protective gloves having a lead equivalent of not less than 0.25 mm should be worn during each fluoroscopic examination. These should cover the whole hand, including back, palm, fingers and wrist.

(54) Before a fluoroscopic examination is begun the eyes must be sufficiently dark-adapted. In order to work with the lowest possible dose-rate, the adaptation period should be at least ten minutes.

Radiography with Fixed Equipment

(55) The X-ray exposure should be controllable from the control panel only, except in the case of special techniques when it is necessary to control the exposure from the couch or stand. In such special techniques it may be necessary for the personnel to wear protective clothing as specified in paragraphs (52) and (53).

(56) The patient shall be observable from the control panel.

Dental Radiography

(68) Localizing cones shall be employed with all dental equipment. Such cones shall provide the maximum practicable focus-skin distance and the minimum practicable field size.

(69) A timer shall be provided to terminate the exposure after a preset time.

(70) Installations operating up to 70 kV should be so arranged that the operator can remain at least one metre (70 kV and over - at least 1.5 m) from the tube and patient. Even under these conditions, for more than 30 mA·min per week, protective screens having a lead equivalent of not less than 0.8 mm should be used.

(71) Consideration should be given to the provision of structural shielding in order to protect persons in adjacent areas. This is particularly necessary when more than one dental unit is located in close proximity.

(72) Whenever possible, the film should be fixed in position; otherwise it should be held by the patient or, exceptionally, by a person who is not occupationally exposed to radiation. It should never be held by the dentist or his staff, who should under no circumstances be exposed to the useful beam.

(73) The tube housing should not be held by hand during exposure.

(74) Fluoroscopy with dental equipment is dangerous and shall not be used.

X-ray Therapeutic Installations

General Requirements

(75) A therapeutic-type protective tube housing shall be used.

(76) Permanent diaphragms or cones used for collimating the useful beam shall afford the same degree of protection as the tube housing. Adjustable or removable beam defining diaphragms or cones shall be constructed so as to reduce the integral dose to the patient as much as practicable. In no case shall they transmit more than 5 per cent of the useful beam.

(77) Each accessible filter shall be marked with its thick-

tected that the permissible doses to the hand and other parts of the body are not exceeded. If the weekly exposure time exceeds 20 minutes the tube housing shall be provided with a hand shield for protection against scattered radiation from the patient. Protective gloves and coats or aprons as specified in paragraphs (52) and (53) shall be worn during this work.

(86) When the inherent filtration is low and the focus-window distance is short, special precautions shall be taken to avoid accidental exposure to the useful beam, brief exposure to which may cause serious injury.

changes that I feel will be necessary.

The plans for the new Baabda Hospital already include a modern Radiotherapy Department incorporating teletherapy (Cobalt beam therapy), deep therapy, superficial therapy and radioisotope facilities. Following my study of these plans with Mr. Jurdak and a visit to the new hospital site, I have suggested changes to include the necessary Medical Physics facilities so that an Anti-Cancer Centre at this hospital would be in accordance with modern internationally accepted practice. Further discussions are due to take place in the near future and if the modifications suggested could be executed I feel that the new Baabda Hospital would be ideal as the chosen site for the establishment of a National Anti-Cancer Centre. I feel, also, that there is much to be said in favour of selecting a site at an institution which is a National or Governmental one - which is so in the case of Baabda Hospital - rather than at an institution which is a private or foreign one.

There is another point which I, as one very conscious of the sufferings of these unfortunate cancer patients, feel it incumbent upon me to mention (although I realise that this has nothing to do with Physics as such). It is natural that one frequently finds a considerable degree of depression among these people. If it is possible to alleviate this depression - even to a small degree - by hospitalising them in a centre having pleasant panoramic views away from the hustle and bustle and continual noise of traffic inherent in a centrally situated clinic, I feel that serious thought should be given to choosing a site which will meet such considerations. In this regard I have not seen any centre near Beirut more ideally situated than the Baabda Hospital where there is a pleasant peaceful atmosphere and having refreshing views such as will not be found at any of the other institutions mentioned.

Furthermore, according to the statistics quoted in the Plan Préliminaire as published by Dr. Jamil Anouti (1963) there is a total of approximately 4750 new cancer cases per annum among the population of Lebanon. In addition, I understand, patients from surrounding countries are also seen in Lebanon. In view of this I would suggest that the existing radiation facilities at the Inst. Radiol. and at the A.U.B. Hospital are insufficiently adequate to meet the needs of the Lebanese people and that the establishment of a National Anti-Cancer Centre is most strongly to be recommended as a matter of considerable urgency. This would not detract from the services already being rendered by the Inst. Radiol. and by the A.U.B. Hospital - which institutions could continue to render a useful service.

Finally, should the Authorities wish to hold discussions on this matter prior to my departure from Lebanon, I would be very pleased to cooperate to the best of my ability and to render every assistance possible.

Dr. E.L.P.P. de Valencé, M.Sc., Ph.D., A.Inst.P., A.M.I.E.E.
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