

Staff Meeting Bulletin  
Hospitals of the » » »  
University of Minnesota

Radiation Therapy Report

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Published for the General Staff Meetings weekly  
during the school year, October to June, inclusive.

Financed by the Office of All Sciences,  
Miami and Paulinas.

William A. O'Brien, M.D.

SPRING is here! - ST. PATRICK'S DAY is just around the corner!  
 Imagine, if you can, what the world would be like - without the  
 Irish! I congratulate you in all humility for our presence in  
 your midst. . . . . The Editor

## I. LAST WEEK

Date: March 6, 1942

Place: Recreation Room  
 Powell Hall

Time: 12:15 to 1:20 P.M.

Program: "Treatment of Pituitary Tumors"  
 Albert V. Stoesser

### Discussion

W. T. Peyton  
 Harold Petersen  
 J. C. McKinley  
 A. T. Rasmussen  
 Arild Hansen  
 Gerald Evans  
 C. J. Watson

Present: 127

Gertrude Gunn,  
 Record Librarian

- - -

## II. MARRIED

Harry Hall, Orthopedics, and  
 Betty Jane Smith, Medical Technology  
 February 14, 1942.

Congratulations and best wishes!

- - -

## III. MEETINGS

### 1. PROTEIN SEMINAR

Seminar on the Structure and  
 Behavior of Proteins. Professor R. A.  
 Gortner. "Plant Protein Studies." Room 15,  
 Medical Sciences, at 8:00 P.M., Thursday,  
 -March 19, 1942.

### 2. THE MINNESOTA PATHOLOGICAL SOCIETY

The University of Minnesota Medical School  
 Institute of Anatomy

Tuesday, March 17, 1942, 8:00 P.M.

- - - - -

President's Address.

Recent studies of the degradation pro-  
 ducts of hemoglobin.

Dr. C. J. Watson.

- - -

### 3. SEMINAR IN PATHOLOGY

12:30 P.M., Monday,  
 March 16, 1942. Room 104. Institute  
 of Anatomy.

Filaria. Dorothy Sundberg Reiff.

- - -

### 4. CENTER FOR CONTINUATION STUDY

Change in time of Course - Kenny Method

for poliomyelitis for medical directors,  
 physical-therapy training schools,  
 from March 23-28 to March 28-April 2,  
 1942.

- - -

### 5. NEXT STAFF MEETING

April 10, 1942

because of Spring Vacation March 20  
 and 27 and Good Friday April 3, 1942.

The staff meeting bulletin #17, pub-  
 lished for the Division of Orthopedics  
 will appear during Spring Vacation and  
 will be sent to all subscribers. Resi-  
 dent staff members will be given their  
 copies at the next meeting.

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#### IV. RADIATION THERAPY REPORT - 1941

##### 1. STATISTICAL REVIEW

K. W. Stenstrom

A special technique is used for each disease or type of tumor treated with radiation therapy. This technique may be gradually changed as the results are studied and more experience is obtained. Though no radical changes have been introduced during the last year, some dosages have been modified, and the time distribution of the radiation has been slightly altered. As a rule, the dose used for carcinoma has been increased whenever possible, and the combination of x-ray and radium therapy has been further emphasized. There is reason to believe that the present modifications will lead to improvement of the results.

Special attention has been directed to relatively new fields of radiation therapy. Among these may be mentioned first the use of  $\beta$ -rays for treatments of inflammatory conditions of the anterior segment of the eye. This method is being more firmly established, the conditions which respond are better defined, and results previously reported are being consistently obtained. Another seemingly important field is the use of gamma rays for treatment of lymphatic hyperplasia of the naso-pharynx and of the eustachian tube. Such hyperplasia is often responsible for impaired hearing in children, and the treatment improves the hearing ability. The experience with this method is still too limited at this institution to permit a real evaluation of its usefulness. A third new field is the use of x-rays in an attempt to arrest progressive exophthalmus. The results to date are promising. Though it is doubtful that appreciable regression has resulted, it can be stated that no progression has been observed as yet after the treatments, and undoubtedly several eyes have been saved. Finally, it is worth mentioning that the use of radiation for treatments of certain types of infections has been further extended.

In order to obtain a survey of the

present use of radiation therapy, two tables have been assembled. The first one contains the different types of diseases which have been treated with high voltage therapy. It also shows the number of patients in each group treated during the 5 years from 1937 to 1941 inclusive, and the number treated during 1941. In the last column are figures which represent the per cent of the 5-year totals which have been treated during the last year. They show whether there is a tendency to increase or decrease the use of x-ray therapy for these diseases. Twenty per cent indicate no change. There is, of course, an irregular fluctuation which has no particular significance when based on a small number of patients. The only reductions which undoubtedly will continue are those concerning carcinoma of the corpus uteri and the prostate. Carcinoma of the corpus uteri has, for several years, been treated preoperatively with both x-rays and radium. The preoperative use of x-ray therapy was discontinued during the last year, and this type of treatment will be reserved mainly for the inoperable and recurrent cases in this group. That explains the drop to 9%. The castration method will undoubtedly be used to a greater extent for carcinoma of the prostate and to a great extent will replace x-ray therapy. Among the groups which have shown a tendency to increase are carcinoma of the tongue and carcinoma of the rectum, 27% and 26% respectively. Radiation therapy is probably of greater value in these types of cancer than has been recognized, and a further increase in these groups may be expected. Among the benign conditions, a decrease is recorded for thyrotoxicosis, 12%, and an increase for gynecological bleeding, 34%.

The second table contains the diseases and number of patients treated with superficial (100 kv.) x-ray therapy. It is interesting to note that the number of cases of furunculosis (including furuncles and carbuncles) has increased considerably, 41%. Acne has also shown an increase, 25%, in spite of the great number of cases referred during previous years.

Table I

Number of New Patients Treated with Deep X-ray Therapy during 1937-41 and during 1941

	<u>Carcinoma</u>		
	<u>1937-41</u>	<u>1941</u>	<u>%*</u>
Breast	450	100	22
Cervix uteri	400	81	20
Corpus uteri	76	7	9
Ovary	43	11	23
Vulva	12	3	
Bladder	68	11	16
Kidney	47	9	19
Penis	9	0	
Prostate	254	44	17
Testis	32	4	13
Lip	60	7	12
Cheek, alveolus	102	26	25
Tongue	45	12	27
Tonsil	21	3	
Pharynx	10	2	
Antrum, sinuses	21	4	
Rectum	38	10	26
Esophagus	21	6	
Stomach, intestine	18	2	
Larynx	24	1	
Lung	33	8	24
Skin	57	5	9

Other Malignant Diseases

Lympho-epithelioms	12	3	
Endothelioma	15	1	
Hodgkins, lymphosarcoma	104	19	18
Sarcomas	86	23	27
Leukemias	79	9	11
Brain tumors	72	16	22
Mixed tumors	28	2	7
Ocular tumors	33	3	9
Miscellaneous tumors	78	13	17

Benign Conditions

Gynecological bleeding	134	46	34
Thyrototoxicosis	193	24	12
Tuberculous glands	29	3	
Infections	212	46	22
Thymic enlargement	12	5	

Table II

Number of New Patients Treated with Superficial X-ray Therapy during 1937-41 and during 1941

	<u>1937-41</u>	<u>1941</u>	<u>%*</u>
Carcinoma skin	442	92	21
Carcinoma lip	185	50	27
Hyperkeratosis	120	23	19
Angioma	114	21	18
Plantar warts	368	81	22
Warts	176	40	23
Dermatitis and eczema	220	51	23
Keloid	92	24	26
Lichen chronicus simplex	46	11	24
Fungus infection	46	9	20
Acne	852	208	25
Furunculosis	68	28	41
Miscellaneous	129	47	30

Table III

Radium Therapy 1941Carcinoma

	<u>New Patients</u>	<u>No. of Treatments</u>
Skin	17	17
Lip	5	8
Oral Cavity	36	40
Thyroid	1	1
Breast	19	27
Uterus (cervix, corpus)	85	103
Vagina	4	4
Prostate	6	6
Bladder	9	11
Esophagus	5	15
Rectum	3	3
Miscellaneous met.	4	4

Other Conditions

Lymphoepithelioma	1	3
Eye and orbit	3	3
Mixed tumors parotid	2	2
Peyronies disease	5	17
Miscellaneous	5	10
TOTAL	210	274
Nasal tube (Hyperplasia)	19	25
Beta ray bomb (Eye)	228	303
TOTAL	457	622

\*Figures represent the per cent of the 5-year totals treated during the last year.

Each year one or more types of cancer have been surveyed in these reports. A statistical study of all the cases treated here is made and analyzed. In this manner, an appraisal of the methods used can be made and usually indications for further improvements of the methods can be obtained.

Three such studies have been started during the last year, but only one has been completed. This one deals with a type of cancer which has proved to be especially difficult to arrest and strenuous efforts will have to be made to improve the methods. It is only by cooperation between different departments that such studies can be made, and Dr. Creevy has made this particular investigation possible. Together with Dr. Hiemstra, he has reviewed all the cases of carcinoma of the bladder treated at the University Hospitals.

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## 2. TUMORS OF THE URINARY BLADDER\*

W. Hiemstra  
C. D. Creevy

Symptoms of bladder tumors and of prostatic obstruction were probably recognized by Hippocrates, and later by Galen<sup>5</sup>. According to Beer<sup>5</sup>, the first important contribution to the subject was Lacuna's monograph in 1551 on the methods of recognition and removal of caruncles of the neck of the bladder. In 1639 Covillard did the first surgical operation on record for tumor of the bladder. Sonnenburg some years later was the first to try to remove the upper two-thirds of the bladder with its peritoneal covering. Until the time of Billroth no great progress was made. In 1874 he successfully removed the first bladder tumor through a suprapubic approach under visual control. Beer<sup>5</sup> states that Bardenheuer in 1887 in Germany performed the first total cystectomy successfully. However, according to Hirman and Smith<sup>22</sup>, Bardenheuer's case died; and they state that the first successful total cystectomy was done by Pawlik. In 1877, Max Nitze, in Dresden, presented his first cystoscope to be used in males as well as in females. After 1886, when the electric bulb replaced the platinum filament for visualization, the fur-

ther development of the modern cystoscope was rapid; and paralleling this was a marked advance in the treatment of bladder tumors, especially benign papillomas. Nitze very successfully removed many benign bladder tumors cystoscopically by means of a heated wire loop soon after 1900<sup>3</sup>. In 1910 Beer<sup>3,5</sup> was the first to perfect fulguration in bladder papillomas. Various operative techniques have been developed, but it is not in the scope of this paper to discuss these. Cleves of Philadelphia, in 1903, first used radium in the bladder<sup>3</sup>. Its use was further developed by many investigators, and in 1919 Duane and Barringer<sup>3</sup> first used glass radon seeds in carcinoma of the bladder. In 1924 the glass was replaced by gold. X-rays have been used in the treatment of bladder tumors for many years both in conjunction with other forms of treatment, and, in some cases, alone. They have been used as external radiation and also as contact therapy<sup>15,19,20,23</sup>. Recently super-voltage x-ray therapy has been employed<sup>10,16</sup>. Our method is described later in this paper.

This paper is a report of 174 cases of tumor of the bladder treated at the University Hospitals, University of Minnesota Medical School, from January 1, 1930 through December 31, 1939. They have been divided into three groups:

- (1) Benign Papilloma
- (2) Papillary Carcinoma
- (3) Infiltrating Carcinoma

This classification is used because of its simplicity. The merits of other classifications, such as that of Broders and that of the Bladder Tumor Registry of the American Urological Association, are acknowledged.

There were 28 benign papillomas and 146 carcinomas, 57 of which were papillary (39%) and 89 infiltrating type (61%). Barringer<sup>4</sup> reported 39.4% papillary and 60.6% infiltrating in his group.

\*From the Department of Radiology and the Division of Urology in the Department of Surgery, University of Minnesota Hospitals, University of Minnesota, Minneapolis.

Ferguson<sup>18</sup> had 45% papillary and 55% infiltrating. Watson and Herger<sup>27</sup> on the other hand report about 60% of the papillary type in a series of 445 cases. Most of the carcinomas were too extensive to permit radical operation.

There were 142 males and 32 females in our series (about  $4\frac{1}{2}$  to 1). Peer<sup>5</sup>

gives the ratio as 4 to 1, and this is the usual ratio.

The average age in the benign group is 62.3 years, the youngest 25, and the oldest 77. In the malignancies, the youngest was 37, and the oldest 85 (average 63.1). The number of cases in various age groups is shown in Table I.

Table I

Age Group	20-29	30-39	40-49	50-59	60-69	70-79	80-89
Benign Papilloma	1	0	1	10	9	7	0
Carcinoma	0	3	8	39	54	36	6

It will be noted that 93 carcinomas occurred between the ages of 50 and 70 (63.7%). Bumpus and Silver<sup>1</sup> give 57.5 years as the average age in their series and they state that 56% were in or above the seventh decade. Butler<sup>2</sup> quotes the Carcinoma Registry as stating that 62% of bladder carcinoma occurs in the fifth and sixth decade. Ash<sup>1</sup> in a report of the Bladder Tumor Registry states that 80% occur after 50 years of age. The youngest case reported by the Carcinoma Registry was in a male 17 years of age. Carcinoma of the bladder is rare before the fourth decade.

In benign papillomas there were four multiple and 24 solitary tumors. Sixteen of the carcinomas were multiple and 130 solitary. Recurrences were not considered as multiple tumors. Barringer<sup>2</sup> reported 58 multiple and 159 solitary cases in his series.

Metastases. The frequency of metastases varies considerably in different reports. Burkland and Leadbetter<sup>8</sup> quote Cunningham as finding metastases reported in 32.3% of a large series from the literature. Spooner found metastases in 29% of a series at the Mayo Clinic. Ash<sup>1</sup> reported 288 cases with metastases in a group of 1668, (17.2%). 35 of our patients (24%) had demonstrable metastases. These figures indicate that metastasis in carcinoma of the bladder

is so frequent as to require a careful search for them before any radical surgical procedure is considered. Burkland and Leadbetter<sup>8</sup> stress the importance of obtaining roentgenograms of the lungs and bones, especially the pelvis.

Symptoms. In the cases of papilloma, the shortest duration of symptoms was 3 days, and the longest 14 years (average 2.6 years). In the carcinoma cases the shortest was 2 weeks and the longest 20 years (average 2.3 years). It may well be questioned whether symptoms of 20 years' standing were due to carcinoma during all that time; but the important fact is that in many cases symptoms were present for one or two years before a diagnosis was made. This point is stressed by many authors.

Hematuria was the first symptom in 15 cases (85%). This agrees well with statements in the literature<sup>5,9,18</sup>. More often than not the hematuria is intermittent and painless. We wish to re-emphasize that hematuria, even though it be of apparently insignificant duration and severity, should demand a thorough search for tumor of the bladder or kidney. Unless the hematuria can be adequately explained otherwise (and it rarely can be) the patient is entitled at least to an excretory urogram and to a cystoscopic examination by a competent urologist. A cystogram may be done if deemed advis-

able<sup>9,18</sup>. It would seem that the public has not been sufficiently educated as to the significance of hematuria.

Frequency and dysuria were the next most common symptoms, being present in approximately one-third of the cases. Nocturia was present in about 15%. Other symptoms occasionally noted were incontinence, feeling of incomplete emptying of the bladder, pain over the region of the bladder and renal colic.

Results of treatment in papilloma.  
The treatment administered in these 28 cases was as follows: Fulguration plus radon- 4; Excision plus x-ray- 1; fulguration plus x-ray- 1; resection only- 2; fulguration only- 19; one case had no treatment. Nine had recurrences. Results of treatment are found in Table II. It will be noted that of the 14 cases which were treated up to and including 1935, 11 are alive at the end of five years.

Table II

PAPILLOMA (28 Cases)											
Years	No. of Cases	1	2	3	4	5	6	7	8	9	10
1930	2	1	1	1	1	1	1	1	1	1	1
1931	0	0	0	0	0	0	0	0	0	0	
1932	1	1	1	1	1	1	1	1	1		
1933	2	2	2	2	2	2	0	0			
1934	6	6	6	6	6	6	4				
1935	3	2	2	2	1	1					
1936	3	3	3	3	1						
1937	3	3	3	2							
1938	7	6	4								
1939	1	1									

Fulguration or removal by cutting current is undoubtedly the treatment of choice in benign papillomas. There is often a question, however, whether or not the lesion is benign and in those cases other forms of treatment such as radon implantation or external radiation are added. Beer<sup>5</sup> reported 248 cases, 160 of which were followed from one to 24 years. Sixty-two showed recurrences at some time or another. There were recurrences even 19 years after the first treatment.

He used fulguration alone in all but 25 cases.

Treatment of Carcinoma. While the treatment of benign papilloma has been well established and the results are reasonably satisfactory, the situation in relation to carcinoma of the bladder is entirely different. The various forms of treatment utilized for carcinoma of the bladder may be summarized as follows<sup>5,19</sup>:

- (1) Fulguration or excision, either transurethral or suprapubic. (Including destruction by actual cautery).
- (2) Implantation of radium needles or radon seeds.
- (3) Resection of part of the bladder.
- (4) Total cystectomy.
- (5) X-ray therapy
  - a. External radiation
  - b. Contact therapy
- (6) Various combinations of the above.

There are indications for and contra-indications to each of the above and there is considerable difference of opinion as to the efficacy of each.

(1) Fulguration. In 1935, Counsellor and Braasch<sup>12</sup> reported astonishingly good results with this form of treatment only. They state: "Seventeen patients whose condition was considered inoperable were treated extensively with diathermy only, and 15 of the 17, or 88%, lived more than 5 years." The others died from unrelated conditions. Bumpus and Silver<sup>7</sup> report the use of diathermy in 77 patients and in 25 cases they report "apparent cures" of 3 to 5 years duration. They state: "No other form of treatment of tumors of the bladder proved as efficacious." So far as we are able to ascertain, the results of Counsellor and Braasch have never been either attained or even approached by other investigators with fulguration or any other form of treatment, and it is probable that they reported a selected group. There is no doubt that some tumors can be satisfactorily eradicated by this method. Fulguration is also a valuable adjunct to other forms of treatment. If considerable of the tumor mass can be removed, radon and x-ray, especially in the form of contact therapy, can be utilized to much greater advantage. Pfahler and Sampson<sup>25</sup> report a case in which 6500 r were delivered to the tumor by external radiation in 1933. Four months later the tumor which was originally 6 cm. in diameter was re-

duced to only 10% of its size. This was destroyed by electrocoagulation through the cystoscope. The patient was entirely free from signs and symptoms in September 1941. Watson and Herger<sup>27</sup> also report the satisfactory use of electrocoagulation after external x-ray therapy.

(2) Use of Radium Needles or Radon. There is a great difference of opinion as to the value of radium or radon in carcinoma of the bladder. Peer<sup>5</sup> states that partial resection and total cystectomy are far superior. He states that the implantation of radon is always a hit and miss affair because "One cannot accurately delimit the extent of the infiltrative process by sight or by palpation from within the bladder." He quotes the Carcinoma Registry as stating that radon gives 8.8% five-year cures and partial cystectomy 18.5%. Ferguson<sup>18</sup> also discourages the use of radium because of ulceration and increase in infection. On the other hand, Barringer<sup>3</sup> favors the use of radon. In a rather extensive article in 1940<sup>4</sup> he reports 228 consecutive cases. Fourteen of these had no radium but only palliative treatment. Out of the 214 cases treated with radium, there was 33.1% five-year survivals (71 cases). Twenty-six of the 214 had been cured of the carcinoma but died of other causes. If we eliminate these 26 cases, he had a five-year survival of 37.8%. Dean<sup>13</sup> states that combining external and interstitial radiation should give better results than either one alone; he stresses the fact that 12 TED is the average successful tissue dose of radiation necessary for the treatment of bladder carcinoma. It is possible that at least part of the failure of both x-ray and radium has been due to insufficient dosage. Dean and Balfour<sup>14</sup> state that they use up to 75 or 80 millicuries of radon, using 2 millicuries gold seeds. They state they have caused no deaths by the local destructive action of gold seeds. Harris<sup>21</sup> says that up to 50 radon seeds of 2 millicuries each may be safely used by experts. Whether or not these large doses are given in one sitting was not stated.

(3) Partial Resection. If the tumor is so situated that it can be adequately removed without disturbing the function

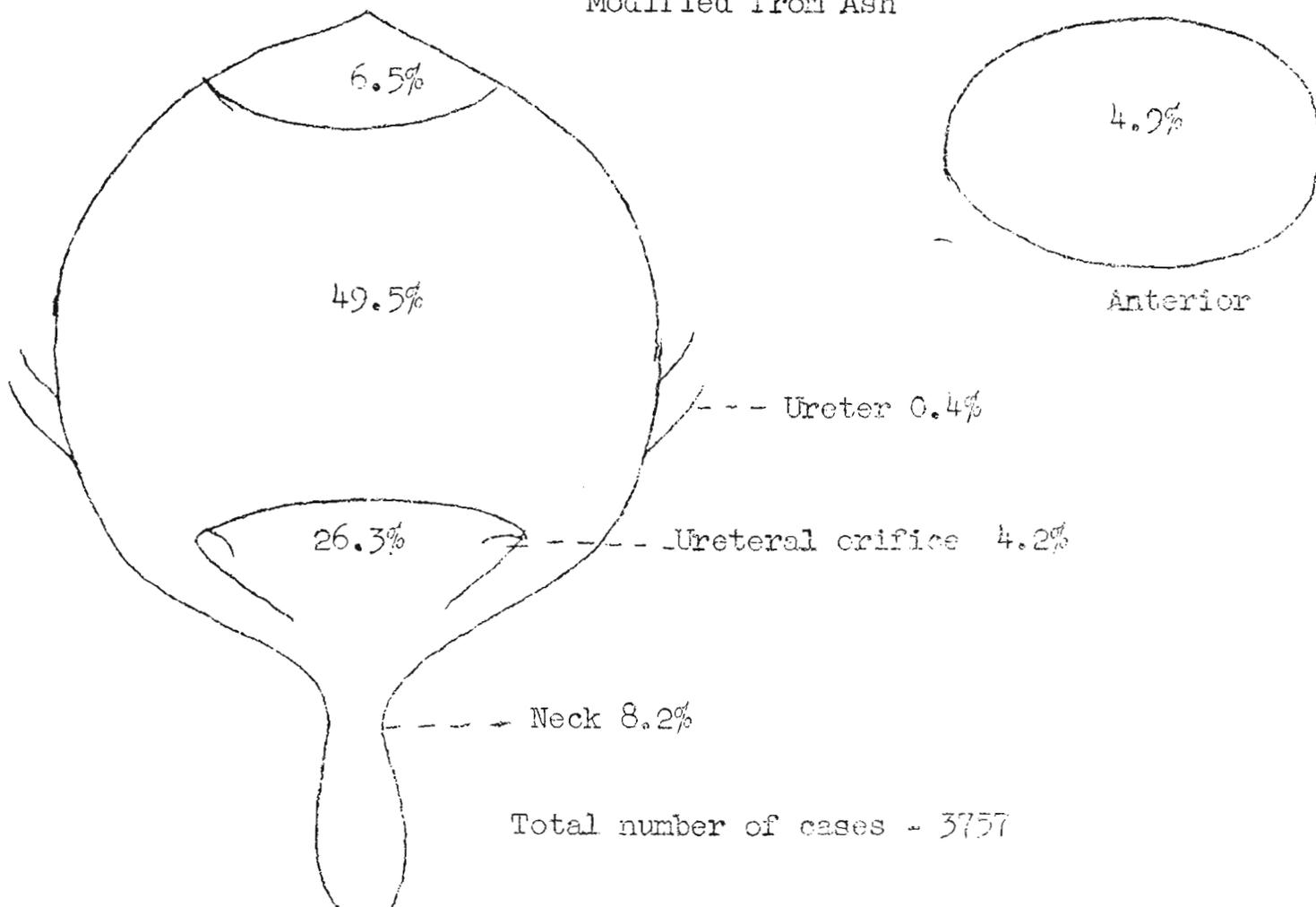
of the bladder to a great extent, it would seem that this is the treatment of choice. Unfortunately, however, the vast majority of tumors are not so situated. Ash<sup>1</sup> gives some interesting data relative to the location of bladder tumors as determined by the Carcinoma Registry in over 2700 cases. Over two-thirds are located in the physiologically indispensable part of the bladder, the posterior wall including the trigone and neck. Figure I (after Ash) shows the distribution of

bladder tumors in percentages. Ferguson<sup>18</sup> reports that 50% of their cases occurred in the lateral walls and 26% in the neck and trigone. It therefore seems obvious that a relatively small percentage of bladder tumors can be considered eligible for this form of treatment, unless they are small, which means being found early.

Figure I

Distribution of Bladder Tumors

Modified from Ash



(4) Total Cystectomy. In the extensive lesion or in lesions involving vital parts of the bladder and therefore excluding the possibility of partial resection, total cystectomy has been frequently undertaken. This procedure has some ardent proponents and also many opponents. Beer<sup>5,6</sup> concludes that resection of the tumor or total cystectomy when necessary, rather

than electrocoagulation or radium, is the method of choice, especially in infiltrating types. Orr, Carson, and Novak<sup>24</sup> report some interesting results from total cystectomy. They sent questionnaires to numerous clinicians and surgeons. The results of the operation mortality was as follows:

<u>Surgeons Reported</u>	<u>No. of Cases</u>	<u>% Mortality</u>
18	29	100%
16	67	50-100%
13	106	25- 50%
21	151	0- 25%

With an average mortality of 33.2%

The above figures do not include the operative deaths due to the preliminary ureteral transplantations. If these were added the average would be greatly increased. Only 18 patients survived 5 years (5%). The authors quote the Carcinoma Registry as showing the average five-year survival rate as being 23%, 15.9% without evidence of disease after 5 years. It, therefore, does not seem that total cystectomy will increase the five-year survival rate in bladder tumors. Of the 267 surgeons reporting, only 8 favored radical treatment. Goin and Hoffman<sup>19</sup> state that the primary mortality in total cystectomy is 50%. Ash<sup>1</sup> states that the trend of operative mortality is definitely lower than it was 10 or 15 years ago, and gives the following figures to substantiate this view: Up to 1928, the mortality in cystectomy or resection was 25% in their cases. In 1934-37 it was 14%. Beer<sup>6</sup> reports an operative mortality of 2 out of 11 cases. He states that his five-year survival out of the remaining 9 is 55% which evidently means that 5 out of 11 original patients survived 5 years or more. These may be selected cases.

(5) X-ray Therapy. The earlier reports regarding x-ray therapy were quite enthusiastic. However, as the cases were followed the results were not as gratifying as had been anticipated so far as five-year survivals were concerned. On the other hand, symptomatic relief is usually obtained.

With the newer forms of x-ray therapy, especially supervoltage and contact therapy, a new and better avenue of approach may have been found. Beer<sup>5</sup> did not believe external x-ray therapy had any appreciable value. Ferguson<sup>18</sup> does not believe external x-ray radiation will wholly destroy

the tumor but does believe it decreases the size of the tumor and relieves the symptoms. Rather recently, contact therapy, usually with the Chaoul tube, has been tried<sup>15,19,20,23</sup>. Goin and Hoffman<sup>19</sup> now use a suprapubic cystostomy rather than marsupialization of the bladder to permit contact treatment. The technique is described in their article. The elapsed time since treatment is only 1 to 19 months and therefore too short to determine final results. Supervoltage x-rays have been used for some time but here again it is too early for definite conclusions. Dresser and Rude<sup>16</sup> state it is their impression that the results from one million volt equipment are better than those from the lower voltages. Schunacher and Steele<sup>26</sup> reported 15 cases. Nine were alive (2 more than 1 year) at the time of writing. Colby<sup>10,11</sup> using a million volt unit, found that the infiltrating carcinomas responded better than the papillary type. However, he reported only 24 cases. He concludes that the dosage is still unsettled but that, since a regression occurs in a majority of cases, the method is worthy of further trial.

We have divided our cases which received x-ray therapy either alone or in conjunction with some other form of treatment into 4 groups:

- (1) Those receiving a tumor dose of 1000 tissue r or less.
- (2) Those receiving a tumor dose of 1000 - 1990 tissue r.
- (3) Those receiving a tumor dose of 2000 - 2490 tissue r.
- (4) Those receiving a tumor dose of 2500 tissue r or over.

The factors used in our cases were as follows: In the earlier cases we used a 200 KVP mechanically rectified General Electric machine, usually using a filter of 1 mm. Cu + 1 mm. Al, the half value layer being 1.4 mm. Cu. In the later cases a 220 KVP self-rectifying Maximator was used with 1 mm. Cu + 1.2 mm. Al, the half value layer being 1.7 mm. Cu. In the earlier cases we used only anterior

and posterior fields. Later, lateral fields were added; and, our present technique is to use one anterior field approximately 20 x 20 cm., a right and left posterior oblique field approximately 13 x 20 cm., and 2 lateral fields about 12 x 20 cm. In group one, 1 patient out of 10 survived 4 years. In group two, 8 patients out of 59 survived 4 years or more. In group three, 4 patients out of 24 survived 4 years or more. The group four cases were all in 1938 and 1939, and therefore too recent for a comparison; but most of them are already dead and the results will definitely not be better in this group than in the others. It therefore seems that increasing the dosage within the above limits has not been of great value.

Our Results in Carcinoma of the Bladder. In Table III are results of all our cases of carcinoma of the bladder, irrespective of type. The survivals are dated from the first treatment at the University Hospital. It will be noted that we have only 12.8% five-year survivals. The discrepancy in the four-year survivals (28%) is due to the fact that the number of cases is too small for absolutely correct statistics but since the rest of the curve follows a definite pattern we feel that it is reasonably accurate. In addition to the five-year survivals, there were 12 cases which were followed more than 3 years and found free of carcinoma. Some of these were among the earlier cases subsequently lost but well when last seen. In addition there was one case who died of pneumonia 4 years after the first treatment and the autopsy revealed no evidence of carcinoma. If these 13 cases are considered as probably cured, the upper limit for possibly cured patients would be 31.4%.

Table III shows the number of cases for each year in the first column. In the next column, we have all the cases who were alive at the end of one year (61 of 146 original cases). This gives a 41.8% one year survival rate. At the end of two years, there were 43 alive. However, the 1939 cases cannot be used for two-year survivals because they were not followed that long (this investigation was started in 1940). So our two-year survivals are 43 of 131 cases. We have no known survivals of more than seven years.

Table IV shows the number of survivals dated from the first symptom. This table is merely included as a matter of interest and not as survivals due to treatment.

Table V shows the type of treatment given, the total number of cases receiving such treatment, the number treated in the manner stated in the table from January 1, 1930 to December 31, 1935, and the five-year survivals calculated from this latter group. It must be stated that those who received x-ray treatment alone were practically all hopeless when first seen. Of the total number of carcinomas 114 are dead, and 5 have been lost, leaving a total of 18.5% known alive.



Table V

Type of Treatment	Total No. of Cases	No. of Cases 1/1/30 to 12/31/35	Five-Year Survival of Cases 1/1/30-12/31/35
Fulguration Only	23	15	2
Fulguration + Radon	10	7	2
Fulguration + X-rays	18	11	2
Fulguration + Radon + X-rays	11	10	1
X-ray only	24	11	0
X-ray + Radon	9	7	0
Resection Only	16	5	1
Resection + Radon	2	1	0
Resection + X-rays	13	-	-
Resection + Radon + X-rays	7	2	0
Partial Cystectomy	1	1	1
Ureterostomy Cystectomy + X-ray	1	-	-
Miscellaneous Treatment (Palliative)	4	-	-
No Treatment	7	-	-

Tables VI and VII show the difference in survival rates of papillary carcinoma as compared with the infiltrating type. The five-year survival rate in the papillary group is 21.4% as compared with only 7.1% in the infiltrating type.

Tables VIII and IX show the survival rates in all cases without metastases as compared with those with metastases. It will be noted that the five-year survival rate in the former is 15.7% as compared with only 5.3% in those cases

with metastases.

Comparison of our results with the results of other authors. In Table X, we show the results obtained by other author as compared with those of our own. These statistics were compiled from the various articles and the five-year survival calculated as nearly as possible on the same basis as we calculated our own. Highly selected groups are not included in this table.

Table VI

PAPILLARY CARCINOMA OF URINARY BLADDER (ALL CASES)											
Years	No. of Cases	Years survival									
		1	2	3	4	5	6	7	8	9	10
1930	2	1	1	1	1	1	0	0	0	0	0
1931	3(1)*	3	3	2	2	2	2	1	0	0	
1932	4	2	1	0	0	0	0	0	0		
1933	1	1	1	1	0	0	0	0			
1934	6(1)	3	3	3	3	1	0				
1935	12(5)	5	4	4	3	2					
1936	9(2)	6	6	4	4						
1937	6(1)	2	2	2							
1938	9(1)	7	5								
1939	5	2									

Table VII

INFILTRATING CARCINOMA OF URINARY BLADDER (ALL CASES)											
Years	No. of Cases	Years survival									
		1	2	3	4	5	6	7	8	9	10
1930	4(2)	1	1	0	0	0	0	0	0	0	0
1931	4(1)	2	1	1	1	1	0	0	0	0	
1932	5(2)	2	0	0	0	0	0	0	0		
1933	10(2)	3	3	3	3	1	1	0			
1934	8(2)	2	0	0	0	0	0				
1935	11(3)	6	5	5	5	1					
1936	14(3)	5	4	4	4						
1937	13(5)	4	2	0							
1938	10(3)	2	1								
1939	10(1)	2									

\*Figures in parenthesis represent cases with metastases.



Table X

## COMPARISON OF OUR SERIES WITH OTHER SERIES

Author	No. of Cases	Type of Treatment	Percentage Five-Year Survival
E. E. Ferguson <sup>18*</sup>	130	Various types and combinations	10.45%
(A. L. Dean and (J. Balfour <sup>14</sup> ) Barringer <sup>4</sup>	50 consec. pap. 50 consec. infil.	Radon and X-rays Radon and X-rays	54.0% 14.0%
Watson and Herger <sup>27</sup>	214	Radon and occasionally radium	33.1%
J. T. Farrell and T. R. Fetter <sup>17</sup>	129 pap. 50 infil.	Various types Various types	28.0% 12.0%
Orr, Carson, and Novak <sup>22</sup> and Butler <sup>9</sup>	72	Various types	4.1%
Authors' Series	Quote the Carcinoma Registry as giving		23.0%
	146	Various types	12.8%
	57 pap.	Various types	21.4%
	89 infil.	Various types	7.1%

\*Of these 130 cases 70 were of the infiltrating type and in these the five-year survival rate was only 4.2%.

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Ash<sup>1</sup> at the conclusion of his comprehensive article published in 1940 constructs the following average case from the Carcinoma Registry Statistics:

"White Male, Age 60 Years.

Chief complaints: Hematuria and dysuria.  
Cystoscopic Examination: Single papillary tumor located on posterior surface of base of bladder.  
Pathology: Papillary carcinoma, Grade 1 or 2.  
Prognosis: Repeated "recurrences" in spite of treatment; has about one chance in three of living 5 years and about one chance in 25 of complete recovery."

We wish to express our appreciation to Dr. Wilhelm Stenstrom, Director of the Division of Radiation Therapy, University of Minnesota, for his many valuable suggestions and criticisms.

#### Conclusions

1. Various data relative to tumor of the bladder have been presented.
2. It is our belief that the duration of symptoms in bladder tumor could be materially reduced by education of the public, and that this is the greatest single factor which would aid in reducing the toll of this disease.

3. Hematuria is stressed as a very important first symptom.
4. The results of the treatment of carcinoma of the bladder are not at all encouraging at the present time.
5. With careful attention to detail the results may be improved with radon and radium therapy in suitable cases.
6. Contact x-ray therapy and possibly supervoltage x-ray therapy may prove of considerable value.
7. External x-ray radiation has not been as effective as was previously thought, especially in tumor dosages of less than 3000 tissue r.
8. Metastases appear more frequently than is generally believed and should be diligently searched for when a radical surgical procedure is contemplated.
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## V. GOSSIP

A few months ago Matie (Mrs. Leo G.) Rigler, innocently inquired if I would help out in a skit to be sponsored by the Drama Section of the Faculty Women's Club for the benefit of the Red Cross. Staff members throughout the University were approached in similar fashion by other members of the faculty wives' organization. Before we knew it we were hooked for parts in a pretentious presentation at the Music Building scheduled for Friday and Saturday evenings, March 6 and 7, to a discriminating audience of fellow faculty members and wives, students, alumni, and friends of the institution. Script was asked for; rehearsal time arranged. When we arrived for our appointments we discovered ourselves in a mob of individuals of varying age, appearance, and abilities. It was evident at once that the music and lyrics which had been composed by Raymond L. Levy, a business man of St. Paul, for the occasion, were going to be hits. The dancers were taught their routines by Mrs. Roy Mercer who demanded as much perfection as one might expect of a minor edition of the Rockettes. For most of us it was our first introduction to capable stage direction in the person of C. Lowell Lees of the University Theatre. The worst blow came when we were compelled to try out our material on the critical mob of fellow troupers in addition to many people who wandered in to witness our humiliation. As we drew closer to the eventful night, it was apparent that we were in for an interesting time, if not a happy one. Night after night rehearsals dragged on into the weary hours. Came Thursday, March 5, and with it dress rehearsal which was sad and disjointed. We were assured, however, that if we made a reasonable effort most of the audience would not walk out. On the eventful night we reported hours ahead of the scheduled time. It was my first introduction to make-up. The small room was filled with giggling women of all ages putting on gobs of make-up, bearing out the old adage that every woman is a hussy at heart when it comes to make-up. The less experienced faculty males stood around in awkward places feeling as if they had invaded some place where they

didn't belong. We attempted, however, to look as blase' as possible as the material were applied - we hummed tunes, drummed on the table, etc. We were told the purpose was not to make us more attractive, but simply to lessen the ghastly effect produced by the lights. The women, however, seemed to accomplish something which was slightly less funereal. The males did not apply any of this stuff to their legs which was a great saving. The ladies, however, quickly resembled old fashioned yellow legged chickens on the farm (color only). We were assigned to our respective places, Act I - green room; Act II - practice room; we waited as if it was all in the day's work but most of us were palpitating with an air of pseudo-professionalism. From the doorway we could hear the double pianos in the opening music with Donald R. Harris at the first and Author Raymond L. Levy at the second. This was most effective. How critical I am becoming! Note: it became well developed in all of us before the ordeal was over. Huntington Miller, of the famous California family - gardens of that name, was first as he gave the President's report. This was a long-winded silly philosophical dissertation on the problems of the campus, as they related to falling leaves from the trees and a budgetary deficiency of 1 token lost by a regent down a drain. This was to emphasize the enormous number of drains on the University budget. Mr. Miller by profession an attorney with impeccable preliminary training, including a gloss coat at Yale decided one bright and sunny morning to quit the law and take up the profession of dramatics. He is a graduate student at the University and is progressing rapidly, in many artistic directions. In typical review style there was a black-out as the "deans" stumbled into their places. Our own superintendent, Ray Amberg, was one of these creatures. Dressed in cap and gown, they went through a routine of racy lines and sprightly steps. The applause was terrific and as they came down with beaming faces, they related how well they had done. Registration day in the General College followed, which explained some of the difficulties in taking courses in this Unit. The brainy

woman, the male athlete, the Scandinavian nit-wit and the dancing doll, were all shown having their difficulties. Jive hit the campus in the next number which featured the Minnesota Hop. Some of our more sedate faculty women vied with younger faculty women, sorority girls and fraternity men in putting on this singing, dancing number. The Dean of Women was lampooned in the next skit as the general subject of allure was discussed. The oldsters were getting a little tired at this stage so a singing-dancing number by the younger group was put on. Glimpses into the life of a professor portrayed this individual as the administration saw him, as his wife saw him, as the students saw him, and as he saw himself. It is unnecessary to state that the skit was full of punch lines (note the professional air). The youngsters came out in another singing-dancing number and then yours truly proceeded to give a health lecture on exercise, using Jean Piccard, the ambling Swiss stratospherist, as the example. Professor Piccard skilled in European pantomime was most effective. He slept through most of the lecture with his gaunt frame wrapped in a red shawl covering a brief athletic costume. His make-up helped portray the picture of an aged man. His tottery exercises completed the impression. The finale in the first act was a patriotic number about bond sales with bebies of marching Red Cross ladies. In the intermission the author and the various persons responsible for the production received the customary ovation and flowers while the weary performers awaited below for more to come. Act II opened with a lovely dancing number featuring various types of dances including representative waltzes from our faculty dancing club. The burlesque number was by a ballet of men including George Burr and K. W. Stenstrom from the medical school. The costumes failed to hide the knobby knees, the bony legs, the hairy arms, and the protruding middles. Dr. Stenstrom was most effective as the end pony, throwing kisses to the audience. The musical background for this number was sung by Michael Culhane, our Irish ballad singer. The next scene portrayed an On to Washington idea with special emphasis on the lighter side of our administrative effort. Just as we must

have the Dean of Women act we must also show the women working on the susceptible male teacher. Don Morgan who had the lead is a member of the German Department I do not know what we would have done without him as he carried the bulk of the solos. "Blueprints" was an act developed by Herbert Heaton of the history department. It showed our extra-curricular course in marriage win its spurs in summer school, find its way into the curriculum and as the scene opens the head of the department is clamoring for a new building to be used as a laboratory for advanced students. You can imagine the rest. There was another romantic singing interlude by the youngsters and then Huntington Miller came back to do the master skit of the evening which was a piano pantomime portraying the season at Northrop using only a stool and a spotlight. He successfully introduced a German, Frenchman, and Russian pianist and carried them through their appropriate mannerisms. So effective was this number that the howls of the audience interfered with the performer who scowled at them many times. Our good friends, the singing, dancing deans returned to tell us of their tax problems and to again bring down the house with applause. The grand finale was replete with snatches of music and dancing numbers from the various acts until finally the stage became so crowded that only waving arms could be seen above the mass of humanity. In a very unprofessional way the cast failed to return for the usual number of curtain calls as most of them had rushed out to show their make-up to their friends and to receive the congratulations of those who did not realize they had it in them. As the bulletin goes to press this thing has been repeated twice for the faculty, once for the students with certain deletions, and now among the other difficulties of military life we have been asked to go out to the Fort and do it for the soldiers. The students frankly enjoyed seeing the faculty make monkeys of themselves for 55¢. The Red Cross and the student war effort have received substantial contributions. The various persons responsible for the idea received well deserved congratulations from all for a capital idea. Already plans for next year's "Faculty Fables of 1943" are being made.....