a mile away from their villages; and this practice has become an order of the State Darbar. The sub-divisional officer of the hills of the north-east wrote a year ago that he thought he had sent all the cases there were in his area. The sub-divisional officer of the south-west said recently that he thought there were but few left in his area. There are some cases left in the hills of the north-west but they are being cleared out as rapidly as possible. Careful survey has not yet been made in the extreme south-east and in the central north. In the villages on the plains the difficulty is greater and approximate knowledge of the incidence of the disease is not available.

Of the 40 cases discharged as probably cured, only those discharged in the absence of the writer have returned for further treatment. It is the custom at the Mission Leper Colony to treat all cases till they seem clinically to be cured, then disinfect them as thoroughly as possible, segregate them from other cases and continue the treatment for two months longer. They are then discharged with certificates in duplicate, one kept by the patient and the other sent to his government headquarters for registration, where they are required to report for inspection bi-monthly. The writer and his medical assistant inspected during the latter half of January this year seventeen of these cases as shown below, aside from the prenatal case:—

No.	Name, etc.	Sex.	Case.	Admitted.	Discharged.	Inspected.	RESULT.
1	Tangvol, Anal ..	m	B?	2-1-19	26-12-19	18-1-29	Relapsed.
2	Humei, Tangkhul ..	m	B2	31-1-24	12- 1-27	29-1-29	Not relapsed.
3	Yargnai „ ..	m	B1	1-6-24	30- 4-27*	22-1-29	do.
4	Arethei „ ..	m	B1	15-5-25	12- 1-27	24-1-29	do.
5	Lakola I „ ..	f	B1	15-5-25	30- 4-27	24-1-29	do.
6	Tuisomla „ ..	f	B1	15-5-25	21- 9-25	24-1-29	do.
7	Lasengla „ ..	f	B1	6-7-25	14-11-25	28-1-29	do.
8	Lakola II „ ..	f	B1	6-7-25	14-11-25	28-1-29	do.
9	Pungsin „ ..	m	B2	4-8-25	5- 3-28	23-1-29	do.
10	Langzar „ ..	m	B1	1-9-25	1-12-25	24-1-29	do.
11	Lathola „ ..	f	B1	18-4-26	14-11-27	24-1-29	do.
12	Sareug „ ..	m	A1	20-5-26	13- 6-28	28-1-29	do.
13	Ngamla „ ..	f	B1	25-5-26	30-12-26	28-1-29	do.
14	Chilangla „ ..	f	B1	27-5-26	19-12-26	28-1-29	do.
15	Miklanla „ ..	f	B1	27-5-26	19-12-26	28-1-29	do.
16	Vaira „ ..	m	B1	27-5-26	30- 4-27	28-1-29	do.
17	Lathuila „ ..	f	B1	25-7-26	30- 4-27	28-1-29	do.

It will be noticed that these are practically all early cases.

It will be observed that (omitting the first case) these were under treatment an average of almost exactly one year.

No. 12 of this series was a mild case of his class.

We have not had the opportunity of inspecting other discharged cases. We saw one case badly relapsed who had left a few months before we had intended to discharge him; he was in the same region as the first of the series.

It will further be noticed that these have been discharged an average of about 25 months only, a bit too short to be sure they will not relapse; four of them were just over three years.

The first case has been just over nine years without treatment, after eleven months and 24 days treatment. He had several large anæsthetic patches; all seemed to clear up under treatment. It appears that treatment for him should have been continued longer. He had mainly the sodium hydnocarpate intravenously.*

The moral effect on all but the first has been very helpful, for they seem very happy at present.

Manipur is such a concentrated area that it is believed the hill section of the State can be nearly cleared of the disease in a few years more. The early cases will have become "cured" and returned to their homes, and the "burnt-out" cases will probably be retained in the Colony as an asylum. The State provides money for the food for all cases, blankets, and salary of local overseer; other agencies provide the buildings, medicines, and medical service.

*This case was discharged in the absence of the writer, believing himself not to be cured, and returned later for further treatment.

ON THE RATIONALE OF TREATMENT OF CARCINOMA OF THE CERVIX UTERI.

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IN order to have a clear idea of the treatment of cases of carcinoma of the cervix

uteri, the pathological anatomy of the part should be considered to a certain extent.

Pathological Anatomy:

There are too many classifications of carcinoma uteri, making the subject complex and too complicated. For all practical purposes we shall stick to Schottlænder and Kermauner's classification which is as follows:—

Macroscopically, the condition is divided into:—

Exophytic, and
Endophytic growths.

An *exophytic* growth is one which has got a tendency to grow outwards inside the vagina. It takes the proliferative or cauliflower-like form. Symptoms appear earlier, and the cancer cells are more radio-sensitive.

An *endophytic* growth eats in to the cervix, sometimes keeping the outward form of the cervix intact, at other times forming a crater-like ulceration. The growth extends commonly into the parametrial tissues, and the lymphatic glands are frequently affected. Symptoms appear rather late, and the prognosis of this type of growth is worse on account of early infiltration of the parametrial tissues.

Histologically Schottlænder and Kermauner have divided carcinoma of the cervix uteri into:—

Primary solid carcinoma; 94.6 per cent.
Primary glandular carcinoma.
Secondary solid carcinoma (from glandular carcinoma).

Solid carcinoma arises from pre-existing squamous epithelium metamorphosed as such by metaplastic changes of cylindrical epithelium. Solid carcinoma may also arise from the surface epithelium of the portio uteri, but it is rare (about 2 per cent.).

Parametria and Lymphatic glands:—

Carcinoma of the portio uteri spreads in all directions and especially towards the parametria. Clinically, the parametria feel indurated in these cases, but in some cases they do not. Wertheim has shown that in 22.5 per cent. of cases the parametria remain quite soft in spite of their being infiltrated by carcinoma cells, while in 14 per cent. of cases, the parametria are quite indurated and yet they are free from cancer cells. This induration is due to round-celled infiltration. This shows that in the management of carcinoma of the portio uteri cases it is not only the local growth which is to be treated, but the parametrial tissue as well should be looked upon with suspicion in each case, no matter whether it is infiltrated or not, and be dealt with accordingly. Similarly the pelvic lymphatic glands—chiefly the iliac and sacral group—should be taken into consideration, because they show cancer metastases in about 25 per cent. of cases as evidenced by Wertheim from his 500 cases.

Historical Review of Treatment:—

Formerly, cases not being early and properly diagnosed, almost all of them were treated too late, and declared hopeless. Cauterisation was the main line of treatment. Freund of Germany was the pioneer to take the rational step of treating cases by abdominal section (1878). About six months later, Czerny of Germany began to do vaginal hysterectomy in similar cases, having a primary mortality of 32 per cent. in his 81 cases. Freund did abdominal section in 95 cases, of which 65 died and the remaining 30 cases did not escape recurrence. The primary mortality being very high, abdominal operation for carcinoma cervix was given up for the next twenty years, until the technique was modified by Bardenheuer by introducing vaginal drainage: and this simple modification reduced the mortality to 33 per cent. Since then, surgical procedures have been improved more or less continuously until 1895, when Riess, Rumpf and Clark simultaneously began to do extensive operations by removing not only the uterus but also the parametrial tissues and the regional pelvic glands. They had this initiative from the surgical principles followed in treating cancer of the breast. But it was left to Wertheim to establish the technique of the modern radical operation. After a laborious study of the method of growth of uterine cancer, and a careful observation and consideration of results following simple hysterectomy, he has shown that a surgical cure can *only* be possible after all the extensions and ramifications of the growth have been removed.

Schauta recommends para-vaginal operation by making deep lateral incisions in the vagina to obtain wide exposure of the vaginal vault, cervix and parametria. This operation is advocated particularly in fat patients.

Other measures taken for dealing with carcinoma uteri are cautery treatment, acetone treatment, and the treatment by innumerable drugs, e.g., arsenic, mercury, copper, cacodylate of sodium, cholesterine, orthocoumarate of soda, and recently specially prepared lead solution. Lead is still in the experimental stage, while the others have not stood the test of time.

Radiotherapy in Carcinoma of the Cervix Uteri.

During the last two decades the radium treatment for carcinoma has come into the field, and is slowly and steadily gaining ground, both from the palliative and curative standpoints. More recently radium treatment has been supplemented by deep roentgentherapy. Radium acts by destroying cancer-cells and at the same time by stimulating the growth of fibrous tissue, so that after a complete course of treatment one gets a soft scar in place of carcinomatous growth.

B- and Y-rays of radium have an effective value up to 7 cm. distance; if the growth extends more deeply than that area, radium rays cannot possibly have much effect unless radium tubes and needles are buried inside the tumour. American workers and the Brussels Radium Institute do bury needles, but the Radium Institutes of Paris and Stockholm do not advocate it. We follow the latter schools because introduction of needles may disseminate cancer cells, and the injured normal tissue might be unfavourably affected by radium, and thirdly owing to the devitalised condition of the parts there is more chance of sepsis.

Intra-abdominal application of radium was recommended by Daels of Ghent, by putting the radium alongside the iliac glands. It is not advocated nowadays.

As radium can act efficiently only locally within an area of 7 cm. and intra-tumoral application of radium not being very much recommended, the advanced cases can be treated better by combining deep roentgen-therapy with radium treatment. According to Seitz and Wintz the lethal roentgen dose for carcinoma is 90 to 100 per cent. of S.D.D. The uterus with its appendages and parametria usually lie about 10 cm. deep from the skin surfaces. In order to obtain 110 per cent. of T.D. in 10 cm. deeper tissues, roentgen exposures have to be from all sides, and the intensity of the rays being accumulated at the seat of tumour, we get the desired dose provided the *x*-ray machine works with really high voltage tension. We have estimated the deep percentage dose in the Seva-Sadan with the ionto-quantimeter, and have got 30 per cent. of E.D. under 10 cm. water-phantom when working with 180 K.V., 4 M.A., 0.5 mm. copper 1 mm. aluminium filters, 30 cm. F.S.D., and a portal of entry 10 cm. by 15 cm. When roentgen exposures are given from anterior, posterior and the two lateral surfaces of the pelvis, we get on an average about 110 per cent. E.D. at the seat of disease.

Operation or Radiation in Carcinoma-Cervix Uteri.

This question can only be solved by carefully scanning the results in both methods after at least five years' observation. In the recent International Congress held in Stockholm in July, 1928, Heyman brought forward exhaustive statistical results, thus giving us opportunities of judging the cases more critically than we could do before.

Operation Statistics.—3,659 cases were collected. They had radical operations done by surgeons of different lands having an average cure (after 5 years) of 35.6 per cent, the primary mortality being 17.2 per cent. From table I, we find that Wertheim did 450 cases with a primary mortality of 19.6 per cent. and a cure rate of 41.3 per cent. Victor Bonny did 192 operations with a primary mortality of 16.2 per cent. and a cure rate of 40.6 per cent. Schauta did 445 cases, having a primary mortality of 8.9 per cent. and a cure rate of 34.6 per cent. Bumm did 179 cases with a primary mortality of 12.3 per cent. and a cure rate of 43.0 per cent. Kroenig did 73 cases with a primary mortality of 39.7 per cent. and a cure rate of 5.5 per cent. Franz did 296 cases with a primary mortality of 14.2 per cent. and a cure rate of 44.9 per cent, and Zweifel did 251 cases, with a primary mortality of 7.6 per cent. and a cure rate of 47.8 per cent. From the above facts we find that successful operation results vary from 5.5 per cent. to 47.8 per cent. The result depends not only upon the efficiency of the surgeon, but also upon the selection of cases. A low percentage of primary mortality and high percentage of cures indicate that only very early cases were operated.

TABLE I.

Results of Operative treatment in Carcinoma Uteri after 5 years' Observation (Heyman).

Authors.	Number of cases operated.	Number of cases cured.	Per cent. of cure.
Wilson ..	84	26	30·9
Bonny ..	192	78	40·6
Peterson ..	47	18	38·3
Wertheim ..	450	186	41·3
Mayer ..	343	107	31·2
Schauta ..	445	154	34·6
V. Jashke ..	84	25	29·8
Thorn ..	96	42	43·8
Egli (Ledhardt)	165	27	16·4
Cullen ..	26	7	26·9
Staude ..	58	17	29·3
Fehling ..	51	7	13·7
Kroenig ..	73	4	5·5
Kelly & Neel ..	82	18	21·9
Hofmier ..	125	43	34·4
Stoeckel ..	243	86	35·4
Doederlein ..	167	54	32·3
Zweifel ..	251	120	47·8
Franz (Berlin)	296	133	44·9
(Jena)	87	33	37·9
V. Frankque ..	36	14	38·9
Bumm ..	179	77	43·0
Davis ..	20	8	40·0
Busse (Kroenig)	58	19	32·2

Radiation Statistics.—Heyman has also collected the results of radio therapy in 3,512 unselected cases (i.e., operable, borderline and mostly inoperable cases) having a cure of 16.3 per cent (Table II). From his own 500 unselected cases, he shows a primary mortality of 1.6 per cent. and a cure rate of 12.4 per cent. after 5 years' observation. Regaud of Paris had 201 cases with a cure rate of 12.4 per cent.; Doederlein treated 1,068 with a cure rate of 13.3 per cent. and Wintz of Erlangen had 415 with a cure rate of 17.1 per cent. The results of radiation therapy

TABLE II.

Results of Radiotherapy in Carcinoma Uteri (operable, borderline, and inoperable cases—all taken together) after 5 years' Observation (Heyman).

Country.	Authors.	Number of cases treated.	Number of cases healed up.	Per cent. of cure.
America ..	Ward & Farrer	76	17	22·4
	Healy ..	155	14	9·0
	Schmitz ..	103	15	14·5
	Clark & Block	144	15	10·5
Paris ..	Rigaud ..	201	25	12·4
Germany ..	Schulte (Baisch)	298	28	14·1
	Kehrer ..	129	36	27·9
	Doederlein ..	1,068	142	13·3
	Kroenig ..	76	6	7·9
	Eymer (Menge)	203	51	25·1
	Wintz ..	415	71	17·1
	Zweifel	49	4	8·2
	Seitz ..	58	14	24·0
	Muehlman ..	31	5	16·1
	Winter ..	48	4	8·3
	Alder (Schauta)	58	14	24·0
Stockholm ..	Radiumhemmet	500	112	22·4

have also been noted in 960 selected cases, i.e., operable and borderline cases, having a cure rate of 34.9 per cent. Heyman had 144 cases with a cure of 44.4 per cent.; Doederlein had a cure rate of 30.8 per cent. in his 357 cases, and Menge had a cure rate of 55.6 per cent. out of his 63 cases. No statistical results in radiation therapy are forthcoming from British surgeons.

The number of operable and borderline cases treated with radiation therapy is still too small for comparison with the number dealt with by operation, still it is obvious from the facts and figures given that radiation therapy (Table III) stands on the same level with operative therapy, and all the more gains ground from having practically no primary mortality.

TABLE III.

Results of Radiotherapy in Operable and borderline Cases after 5 years' observation (Heyman).

Country.	Authors.	Number of cases treated.	Number of cases healed up.	Per cent. of cure.
America ..	Ward & Farrer	18	9	50·0
	Healy ..	34	8	23·5
	Clark & Block	22	6	27·3
Paris ..	Schmitz ..	18	9	50·0
Germany ..	Rigaud ..	81	15	18·5
	Schulte (Baisch)	101	24	23·8
	Kehrer ..	59	24	40·7
	Doederlein ..	375	110	30·8
	Eymer (Menge)	63	35	55·6
	Wintz ..	55	29	52·7
Stockholm	Zweifel ..	8	2	25·0
	Radiumhemmet	144	64	44·4

The results obtained by radical operation in England and on the Continent can never be obtained in India, because the constitution of average Indian women is too frail to bear the shock of a severe radical operation. The percentage of primary mortality would be enormously high. And if the question of operation is to be considered in surgery for cancer of the uterus, Wertheim's radical operation is the only operation of choice. Simple removal of the uterus either per vaginam or abdominally can never be a satisfactory or rational way of treatment. The idea of prophylactic radiation therapy after vaginal or abdominal hysterectomy is not quite ideal. Prof. Regaud says: "Preliminary hysterectomy is a mistake, because it scatters malignant cells. Under the circumstances, it is to be admitted that of all the forms of treatment in carcinoma of the cervix uteri, radiation therapy deserves the first place, and is the treatment of choice in India.

A YEAR'S RECORD OF KATA-THERMOMETER READINGS AT RANGOON.

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IT is now generally recognised that the mere observation of the temperature of the air in a room by means of an ordinary dry bulb themometer is no index of comfort and gives no measure of the rate of loss of body heat in it. The thermometer measures the degree, not the quantity of heat, and gives no measure of radiation, or of humidity, of drying power or cooling power, exerted on the skin. To measure the cooling power the kata-thermometer was first introduced by Leonard Hill. Since air velocities can also be calculated rapidly and accurately with it, it is of very great value for testing atmospheric conditions in schools, factories, etc. The wet kata-thermometer is of particular value in warm atmospheres where skin perspiration is pronounced, as in the tropics and in textile mills and mines.

The first systematic kata-thermometer readings to be undertaken in Burma were begun on the 4th January 1927. and thence every week for a whole year readings were recorded. It is hoped that these will furnish useful preliminary data from which to formulate a relative comfort standard under the conditions existing in the country. Considering that for each type of work there are