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KING EDWARD VII SANATORIUM  
MIDHURST

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*TWENTY-SEVENTH  
ANNUAL REPORT*

embodying

“Tuberculosis of the Larynx and  
Artificial Sunlight Treatment”

by

Sir StClair Thomson, M.D., F.R.C.P.,  
F.R.C.S.

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JULY 1932 to JUNE 1933



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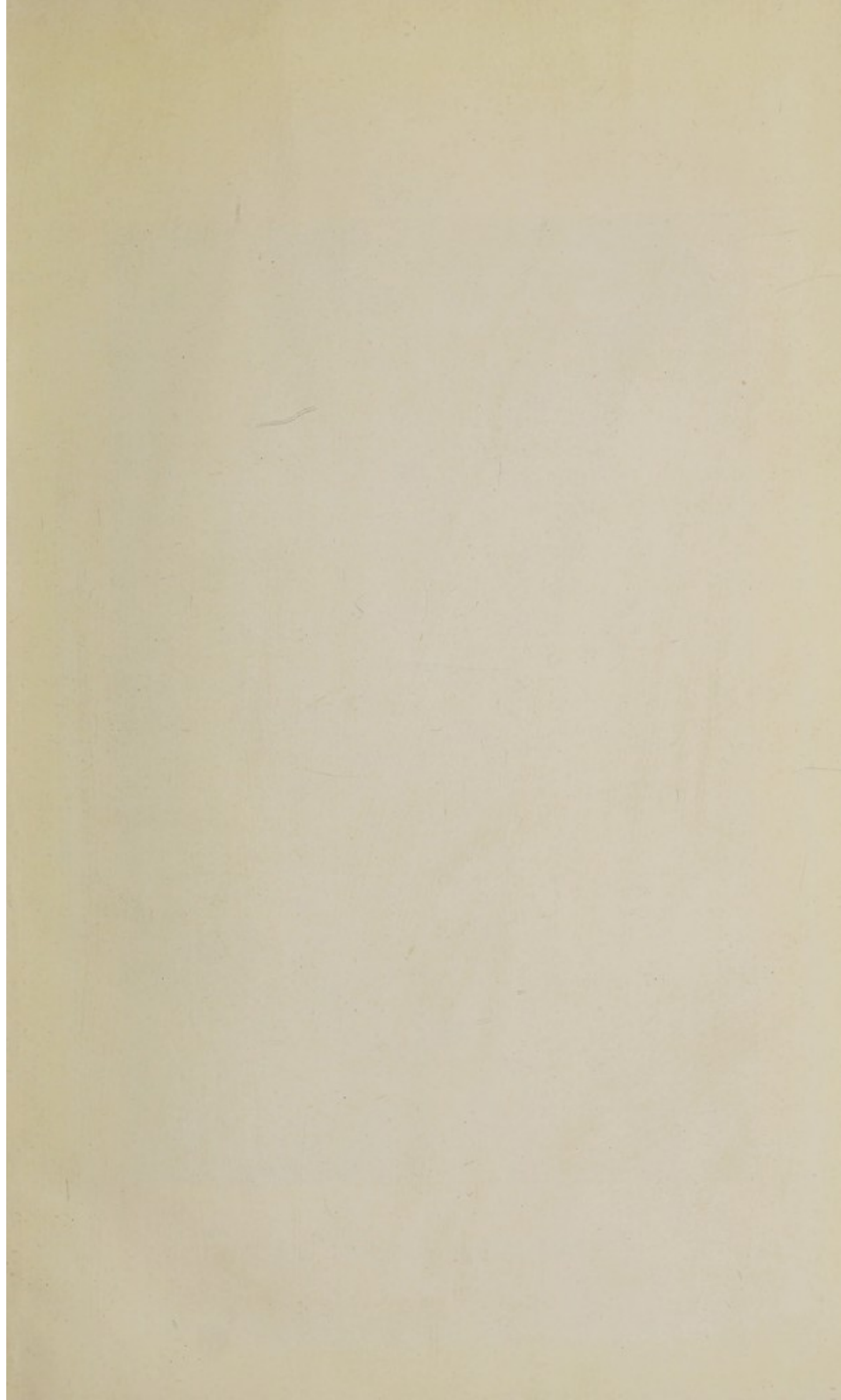
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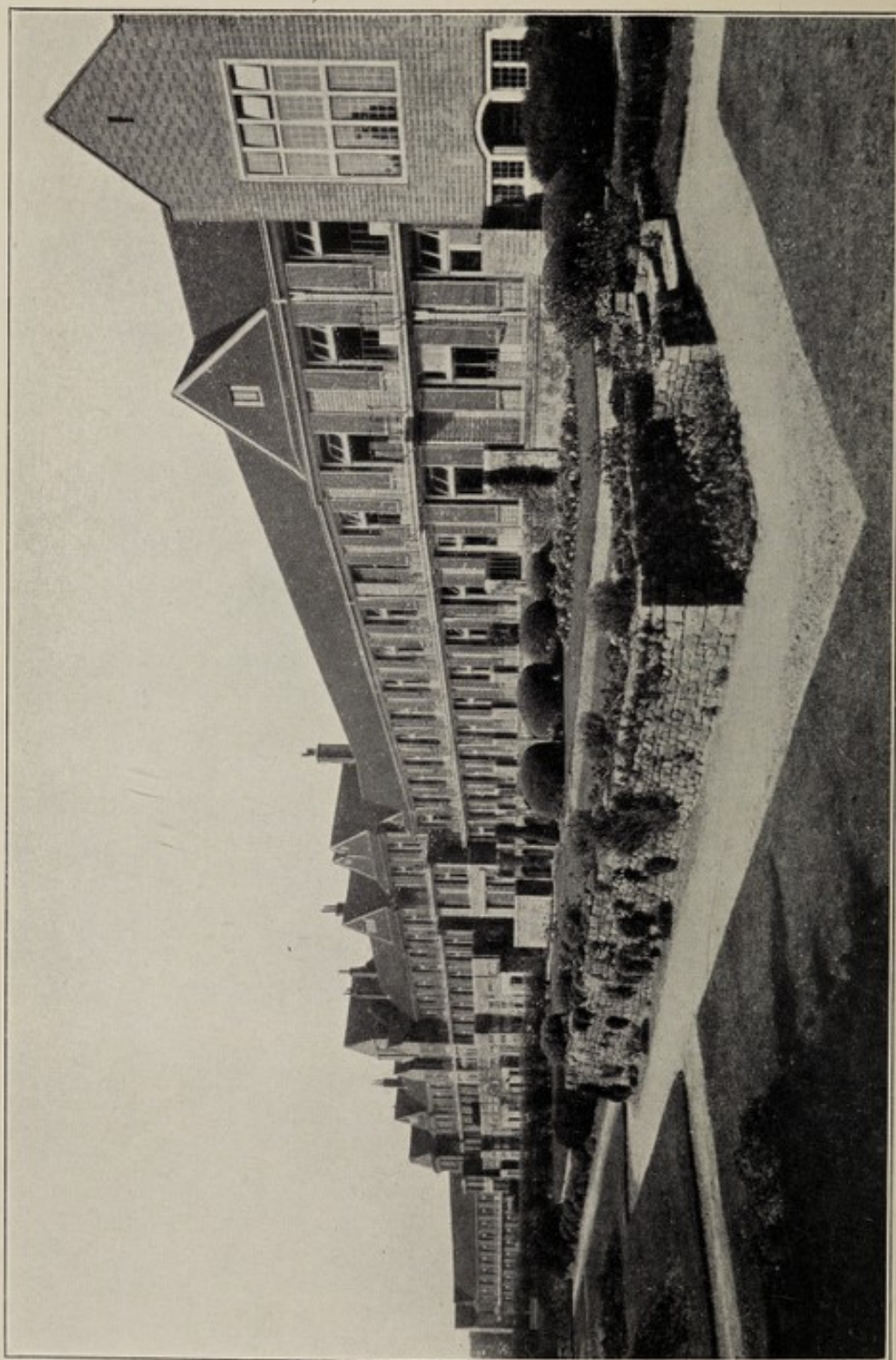
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KING EDWARD VII SANATORIUM, MIDHURST.  
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KING EDWARD VII SANATORIUM  
MIDHURST

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# KING EDWARD VII SANATORIUM MIDHURST

## Twenty-seventh Annual Report JULY 1932 to JUNE 1933

**D**URING the year under review, 320 patients were admitted to the Sanatorium; 46 of these were re-admissions, and 65 remained for a period of less than nine weeks; these 65 were too advanced to warrant continued treatment in the Sanatorium, and their after-histories will not be followed up in the tables of ultimate results in the Statistical Department.

During the same period 220 patients were discharged, and in accordance with the conditions of grouping which are to be found on page 9, were classified as follows on admission:—

Group I	..	..	..	..	..	40
Group II	..	..	..	..	..	119
Group III	..	..	..	..	..	39
Group IV	..	..	..	..	..	22

The applications for particulars of admission numbered 380, and the average waiting list has been the same as for the previous year, *i.e.*, between 10–11 for men and 9–10 for women.

Ninety-six applicants were examined by the Medical Superintendent, and 86 (89·6 per cent.) were accepted and 8 (10·4 per cent.) were rejected as being unsuitable for admission under the rules of the Sanatorium. Of the 22 cases classified in Group IV as having no definite evidence of Pulmonary Tuberculosis, in seven nothing definite was found, and in the remaining 15 there was evidence only of thickened pleura.

Artificial Pneumothorax has been employed in 173 cases, and it is hoped to publish a special report soon which will amplify that prepared for the *Quarterly Journal of Medicine* in July, 1932.

The number of operations for phrenic evulsion and thoracoplasty would also seem to warrant special notice, and it is hoped later on to publish a paper which will give detailed accounts of these cases. Phrenic evulsion has been performed in 66 cases,



and the results have been particularly interesting in cases of apical disease. Thirteen cases have been sent up for Thoracoplasty by Mr. Tudor Edwards during the last five years, and 12 of these are now alive, with an after-history of six months to five years from the date of operation.

The special classes at the Sanatorium of basket-work and embroidery were very successful during the winter, and they were carried on at the request of the patients through the summer months.

Staff Concerts were given during the winter, and a Talking Picture Programme is now provided every Friday evening between October and March. By the time of the publication of this report, an operating theatre will have been equipped, so that all surgical procedures now employed in the treatment of Pulmonary tuberculosis can be carried out at the Sanatorium.

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## GENERAL STATISTICS.

The following tables show an analysis of the 220 patients discharged during the year, with regard to :—

- (1) Place of Residence.
- (2) Occupation.
- (3) Age and Sex.
- (4) Married or Single.
- (5) Mode of Onset.
- (6) Duration of Disease.



TABLE I.—PLACE OF RESIDENCE.

Place of Residence	Number of Patients	Place of Residence	Number of Patients
London .. .. .	76	Lancashire .. .. .	8
Surrey .. .. .	23	Ireland .. .. .	7
Middlesex .. .. .	17	Yorkshire .. .. .	6
Sussex .. .. .	15	Hertfordshire .. .. .	4
Essex .. .. .	12	Lincolnshire .. .. .	3
Kent .. .. .	12	Devon .. .. .	3
Hampshire .. .. .	9	Northampton .. .. .	2
Norfolk .. .. .	1	Durham .. .. .	2
Southampton .. .. .	1	Birmingham .. .. .	2
Buckinghamshire .. .. .	1	Wales .. .. .	2
Berkshire .. .. .	1	Wolverhampton .. .. .	2
Newcastle .. .. .	1	Bedfordshire .. .. .	2
Derbyshire .. .. .	1	Salop .. .. .	1
Leicestershire .. .. .	1	Wiltshire .. .. .	1
Warwickshire .. .. .	1	Worcestershire .. .. .	1
Leeds .. .. .	1	Peterborough .. .. .	1
			220

TABLE II.—OCCUPATION.

Occupation	Number of Patients	Occupation	Number of Patients
Clerks .. .. .	47	Solicitors .. .. .	2
Housewives .. .. .	34	Apprentices .. .. .	2
Nurses .. .. .	14	Navy .. .. .	2
Teachers .. .. .	12	Agents .. .. .	3
Accountants .. .. .	9	Clergymen .. .. .	2
Students .. .. .	8	Farmers .. .. .	2
Nil .. .. .	7	Schoolboys .. .. .	2
Travellers .. .. .	7	Manufacturers .. .. .	2
Secretaries .. .. .	6	Housekeepers .. .. .	1
Inspectors .. .. .	6	Metallurgists .. .. .	1
Doctors .. .. .	5	Surveyors .. .. .	1
Army .. .. .	5	Artists .. .. .	1
Managers .. .. .	5	Masseuses .. .. .	1
Civil Servants .. .. .	5	Hotel Proprietors .. .. .	1
Engineers .. .. .	4	Buyers .. .. .	1
Chemists .. .. .	3	Founders .. .. .	1
Saleswomen .. .. .	3	Organisers .. .. .	1
Brokers .. .. .	3	Merchants .. .. .	1
Dentists .. .. .	1	Civic Guards .. .. .	1
Schoolgirls .. .. .	1	Actresses .. .. .	1
Retired .. .. .	1	Barristers .. .. .	1
Schoolmasters .. .. .	1	Footmen .. .. .	1
		Salesmen .. .. .	3
			220

TABLE III.—AGE AND SEX.

Years						Males	Females	Total
Under 20	..	..	..	..	..	5	9	14
20-25	..	..	..	..	..	27	22	49
26-30	..	..	..	..	..	25	24	49
31-35	..	..	..	..	..	17	18	35
36-40	..	..	..	..	..	19	7	26
41-45	..	..	..	..	..	14	7	21
46-50	..	..	..	..	..	7	4	11
Over 50	..	..	..	..	..	12	3	15
						126	94	220

TABLE IV

Married	..	..	..	..	..	..	105
Single	..	..	..	..	..	..	115
							220

TABLE V.—MODE OF ONSET.

Mode of Onset						Number of Cases	Percentage
Cough	..	..	..	..	..	88	40.0
Pleurisy	..	..	..	..	..	41	18.6
Hæmoptysis	..	..	..	..	..	14	6.4
Influenza	..	..	..	..	..	18	8.2
Lassitude	..	..	..	..	..	34	15.5
Pneumonia	..	..	..	..	..	3	1.3
Other Modes	..	..	..	..	..	22	10.0
						220	100.0

TABLE VI.—DURATION OF DISEASE.

Average duration .. 2 years, 1 month, 3 weeks.

Extremes .. 3 weeks—34 years.

TABLE VII.—GENERAL RESULTS OF TREATMENT AS SHOWN BY THE CONDITION OF THE PATIENTS ON ADMISSION AND ON DISCHARGE FROM THE SANATORIUM DURING THE YEAR 1931-1932

Group on Admission	Number of Cases	Arrested	Much Improved	Improved	Stationary or Worse	Died in Sanatorium
I .. ..	40	36	3	1	—	—
II .. ..	119	51	29	26	12	1
III .. ..	39	—	7	8	24	—
All cases ..	198	87	39	35	36	1
IV ..	Patients in whom no definite evidence of Pulmonary Tuberculosis was found	Number of Cases.				
		22	11	11	—	—



GROUPS.—As in previous Annual Reports, the Turban-Gerhardt classification has been used to indicate the clinical condition of patients on admission. This classification, based on physical signs, is as follows :—

Group I.—Disease of slight severity, limited to small areas of one lobe on either side, which, in the case of affection of both apices, does not extend beyond the spine of the scapula or the clavicle, or in the case of affection of the apex of one lung, does not extend below the second rib in front.

Group II.—Disease of slight severity, more extensive than Group I, but affecting at most, the whole of one lobe ; or severe disease extending at most, to the half of one lobe.

Group III.—All cases of greater severity than Group II, and all those with considerable cavities.

By “disease of slight severity,” is to be understood, disseminated foci characterised by slight dullness, indefinite rough or weak vesicular, vesico-bronchial, or broncho-vesicular breathing, and fine and medium crepitations.

By “severe disease” : massive infiltration recognised by definite dullness, broncho-vesicular or bronchial breathing, with or without crepitations.

Cases with signs of considerable excavation, giving rise to tympanitic percussion with amphoric or cavernous breathing and numerous coarse consonating rales, come under Group III.

Pleuritic dullness, if only of slight extent, is to be left out of account ; if it is considerable, pleuritis should be specially mentioned under tuberculous complications.

The following terms are used to describe the condition of patients on discharge from the Sanatorium :—

“DISEASE ARRESTED.”—General health completely restored in every respect, without any sign of disease of the lungs except such as is compatible with a completely healed lesion. Sputum, if still present, free from tubercle bacilli.

“MUCH IMPROVED.”—General health good. Physical signs of disease in the lungs, though much diminished, not entirely cleared up, *e.g.*, limited to a few crepitations on cough only. Tubercle bacilli still to be detected in the sputum.

“IMPROVED.”—General health improved, but not restored. Physical signs of disease in the lungs still present, though less marked than on admission.

“STATIONARY.”—No appreciable improvement in the condition of the lungs or in the general health.

“WORSE.”—General or local condition worse.



TABLE VIII.—DEMONSTRATION OF T.B. IN SPUTUM

On Admission				On Discharge			
Positive	..	..	142	Positive	..	..	82
Negative	..	..	41	Negative	..	..	84
No Sputum	..	..	21	No Sputum	..	..	38
Group IV Cases	..	..	16	Group IV Cases	..	..	16
All Cases .. .. 220				All Cases .. .. 220			

Number of Patients whose sputum became T.B.—in Sanatorium . . 60

TABLE IX.—WEIGHT

Weight					Group I	Group II	Group III	Group IV
Gained	..	..	..	..	32	91	20	17
Lost	..	..	..	..	8	19	6	4
No Change	..	..	..	..	—	—	1	1
Not Weighed	..	..	..	..	—	9	12	—
All Cases .. ..					40	119	39	22

## REPORTS OF SPECIAL DEPARTMENTS.

### REPORT OF THE THROAT DEPARTMENT.

Two hundred and twenty patients were examined during the year ending 30th June, 1933, and in all the larynx was examined by Sir StClair Thomson. Of these, 23 had definite tuberculous disease of the larynx. The results of treatment are shown in Tables X, XI and XII.

TABLE X.—SHOWING THE RESULT ON DISCHARGE OF TREATMENT IN PATIENTS SUFFERING FROM TUBERCULOSIS OF THE LARYNX IN WHOSE SPUTUM TUBERCLE BACILLI *were* DEMONSTRATED IN THE SANATORIUM.

			Number of Cases.	Cured	Much Improved	Improved	Stationary or Worse	Remarks
Group I	..	..	—	—	—	—	—	For cases treated with Galvano- Cautery, <i>see</i> Table XII
Group II	..	..	5	2	1	1	1	
Group III	..	..	10	2	2	2	4	
All Cases	..	..	15	4	3	3	5	

TABLE XI.—SHOWING THE RESULT ON DISCHARGE OF TREATMENT IN PATIENTS SUFFERING FROM TUBERCULOSIS OF THE LARYNX IN WHOSE SPUTUM TUBERCLE BACILLI *were not* DEMONSTRATED IN THE SANATORIUM.

			Number of Cases	Cured	Much Improved	Improved	Stationary or Worse	Remarks
Group I	..	..	—	—	—	—	—	For cases treated with Galvano- Cautery, <i>see</i> Table XII
Group II	..	..	5	3	—	2	—	
Group III	..	..	3	1	—	—	2	
All cases	..	—	8	—	—	2	2	

TABLE XII.—SHOWING RESULT ON DISCHARGE OF TREATMENT WITH THE GALVANO-CAUTERY IN PATIENTS SUFFERING FROM TUBERCULOSIS OF THE LARYNX.

				Number of Cases	Cured	Much Improved	Improved	Stationary or Worse
Group I	..	..	..	—	—	—	—	—
Group II	..	..	..	—	—	—	—	—
Group III	..	..	..	1	1	—	—	—
All cases	..	..	..	1	1	—	—	—



## ARTIFICIAL PNEUMOTHORAX, PHRENIC EVULSION AND THORACOPLASTY CASES.

During the last nine years ending 30th June, 1933, Artificial Pneumothorax was attempted in 173 cases. In 128 cases it was possible to induce an artificial pneumothorax, while in the remaining 45 either no space was found, or it was impossible to carry on treatment because of adhesions. All cases have been grouped according to the definition in former Annual Reports.

Choice I.—Cases with involvement of one lung.

Choice II.—Cases with cavitation or much evident fibrosis of one lung, or with involvement of the better lung not beyond the upper third.

Choice III.—Cases *in extremis*, e.g., with hæmoptysis.

Cases with bilateral disease, but with a possibility of benefit by a limited pneumothorax on the more active side.

### AFTER-HISTORY OF CASES SUCCESSFULLY INDUCED.

Of the 128 in which it was possible to carry out treatment, 108 are still alive (84.3 per cent.), and of these 108, 86 (79.6 per cent.) are now negative for "T.B.," or have no sputum. Seventy-four of them have now ceased re-fills, and can be divided into groups as shown in the following table:—

TABLE XIII.—CASES CEASED REFILLS AND STILL ALIVE.

	Choice.			Larynx Healed.	Sputum.		Total.
	I.	II.	III.		T.B. +	T.B. — or No Sputum.	
Completed treatment .. .. .	15	19	—	4	3	31	34
Re-expanded .. .. .	4	13	—	1	6	11	17
Obliterated after fluid .. .. .	6	8	1	2	4	11	15
Stopped for disease on other side .. .. .	2	6	—	—	4	4	8
	27	46	1	7	17	57	74

Some cases were able to continue their treatment until such time as it was considered safe to re-expand the lung, and these are given under the heading of Completed Treatment. The "re-expanded" cases are those where the lung re-expanded spontaneously, while those that gradually obliterated after fluid are tabulated as "obliterated after fluid."



In some cases the lung had to be re-expanded because of the appearance or spread of disease on the other side. The table also includes a heading for those who had laryngeal tuberculosis. It will be seen that 34 cases have completed treatment, and that 31 of these are now negative. The results are not so good in those cases where the lung re-expanded, and there is little to choose between them and cases in which obliteration took place. Seven cases had laryngeal tuberculosis, and six are now soundly healed. Of the total 74, 18 had Complementary treatment of some other type, but reference will be made to this in a special paper.

TABLE IV.—CASES STILL ON RE-FILLS.

			Sputum.		Totals.
			Larynx Healed.	T.B. + T.B. — or no sputum.	
Choice I ..	..	—	1	10	11
Choice II ..	..	4	3	19	22
Choice III ..	..	1	1	—	1
			5	29	34

Thirty-four cases are still on refills and 29 (85·3 per cent.) are T.B. —, or have no sputum. Five had laryngeal tuberculosis, and all 5 are healed; 20 cases, in whom an induction was successful, have since died; 14 of them died from advancing disease, 1 of hæmoptysis and 3 of Pyo-Pneumothorax; 1 died of complicating Lymphadenoma, and 1 from Influenzal pneumonia. Of the 20, 9 had Laryngeal Tuberculosis. The following table gives the after-history of 45 cases where it was not possible to carry out the treatment, or where it had to be given up because of gross adhesions.

TABLE XV.—FAILURES.

				Alive.	Dead.	Totals.
Choice I.—No space or only						
	pocket	..	..	I	—	I
	Adhesions	..	..	—	—	—
Choice II.—No space or only						
	pocket	..	..	20	8	28
	Adhesions	..	..	I	3	4
Choice III.—No space or only						
	pocket	..	..	2	3	5
	Adhesions	..	..	—	7	7
				24	21	45



It will be seen that 24 are alive and 21 dead. A more detailed reference will be made in the special paper already mentioned.

Mr. Tudor Edwards has performed thoracoplasty in 13 cases to date; 12 survive, and 8 of these have now negative sputum. It is interesting to note that 2 of these latter cases had laryngeal tuberculosis which did not improve on voice rest, but which healed shortly after the operation; 6 of the 12 cases are at work.

#### SANOCRY SIN.

The after-history of 77 cases who have had Gold treatment has been followed up: 11 are dead; 4 of these had artificial pneumothorax in conjunction with the gold, and one had a phrenic evulsion. Of the 66 alive, 39 have now no sputum or negative sputum. In 4 cases the gold was combined with Artificial Pneumothorax, in 1 case with Phrenic Evulsion, and in 1 with Thoracoplasty; 27 cases are still positive, and 3 of these had Artificial Pneumothorax and 1 a Thoracoplasty.

### REPORT OF THE X-RAY DEPARTMENT.

The total number of examinations during the past year shows a slight decrease. This is due to a reduction in the number of cases of pneumothorax re-fills.

With the increase of other centres where refills can be done, this is a natural result.

By technical alterations during the year some improvement has been made in the quality of the film reductions.

A safety cabinet has been installed for storing films.

Fig. I is chosen to illustrate the difficulty of diagnosis of a cavity. Clinically there was some whispering pectoriloquy in the right upper zone in front, but this was not sufficiently defined to justify a positive diagnosis. The film suggested cavitation, but was not conclusive. After semi-collapse of the lung by artificial pneumothorax, the evidence of the second film (Fig. II) is overwhelming.

### REPORT OF THE DENTAL DEPARTMENT.

The following dental treatment has been carried out during the year :—

Fillings	..	..	..	..	..	143
Extractions	..	..	..	..	..	87
Scalings	..	..	..	..	..	21
Radiographs	..	..	..	..	..	4
Repairing Dentures	..	..	..	..	..	11
Dentures	..	..	..	..	..	13



## REPORT OF THE PATHOLOGICAL DEPARTMENT.

The routine work for the year ending 30th June, 1933, has been as follows :—

Sedimentation Tests .. .. .	1,658
Wassermann Reactions—248 negative, 5 positive .. .. .	253
Blood Counts .. .. .	33
Pleural Fluids .. .. .	13
Ear Swabs .. .. .	4
Urine Examinations (Special) .. .. .	12
Vaccines .. .. .	3
Miscellaneous .. .. .	19
	<hr/>
	1,995

Sputum Tests over 2,500.

### THE SEDIMENTATION TEST.

A few points of interest may be mentioned. An impression that the reading of the sedimentation test when done a second time—that is, after one month's admission to the Sanatorium—was more often higher than lower is not borne out by facts.

	Equal.	First test reading higher.	Second test reading higher.
Men .. .. .	6	45	45
Women .. .. .	7	29	30

Total number of cases counted was 207. In this series, picked at random, no alteration occurred in the rate in 6·2 per cent. of cases ; in the remainder it was as often lowered as raised.

2. To test the accuracy of the micro method of performing the sedimentation test, parallel tests were set up, first with the original fine-drawn capillary tubes as used by Dr. Inman. In a series of over 400 tests, each being set up twice, both tubes being filled one after the other from the same sample of citrated blood, it was found that quite often wide variations occurred, the highest in this series being a difference of 14 per cent. The greatest differences were noticed between the percentage rates of 20 to 45. This experiment was repeated with accurately-made pipettes, instead of the drawn tubes, each holding 0·1 ml., the column of blood in each



being 100 millimetres long, and again it was found that still an appreciable difference occurred from time to time. In a series of cases of 200, the first pipette showed a higher reading 104 times, the second 50 times, and in 38 the readings were equal.

This would appear to show that the plunging in and the mixing with the first pipette influences in some way the reading of the second pipette. It is probable that the higher is the more correct reading. In this series a maximum difference of 11 per cent. (millimetres) was observed, and again between 20 and 40 millimetre readings.

Differences observed between two completely parallel tests, using separate blood-dropping pipettes for each, were noted. Both samples were taken from one stab hole; no note was made as to which was first drawn off, and hence it is possible that the prolonged squeezing necessary in one or two cases may have influenced the result of the test of the second sample. In a series of 15 a maximum difference of 13 millimetres was recorded, but the results were, on the whole, as close together as parallel tests from the same sample.

As a preliminary to the above, an experiment was undertaken to determine, by the leucocyte count, the variation of the proportion of citrate to blood when using dropping pipettes of different sizes. The difference by volume was found to be 0.6 per cent. The difference between the leucocyte counts was 290 cells per c.mm. In other words, an accurate total leucocyte count may be made from the sample of citrated blood, as used in this micro technique.

No doubt the proportion of citrate to blood varies with different bloods, the varying viscosity producing different-sized drops.

Auto-agglutination. This occurs in an intense degree in about 2 per cent. of cases at a rough estimate, and has been found to be present quite frequently in the same patient on repetition. When present in a marked degree, a reading at room temperature, 66° to 74° F., is impossible, and doubtless some of the wide differences observed in these parallel tests were due to its occurrence.

When placed in a water bath at 37° C., the red cells sediment without gross clumping. A reading at two hours, when using these small bore tubes, is probably more reliable in revealing an abnormality of rate than a one-hour reading.

Conclusion. For practical clinical purposes the micro method is of quite sufficient accuracy, especially when frequently repeated, as it should be. Marked errors occur usually only in abnormal rates. Intense auto-agglutination giving a false normal reading can always be identified by a close inspection of the column of blood.

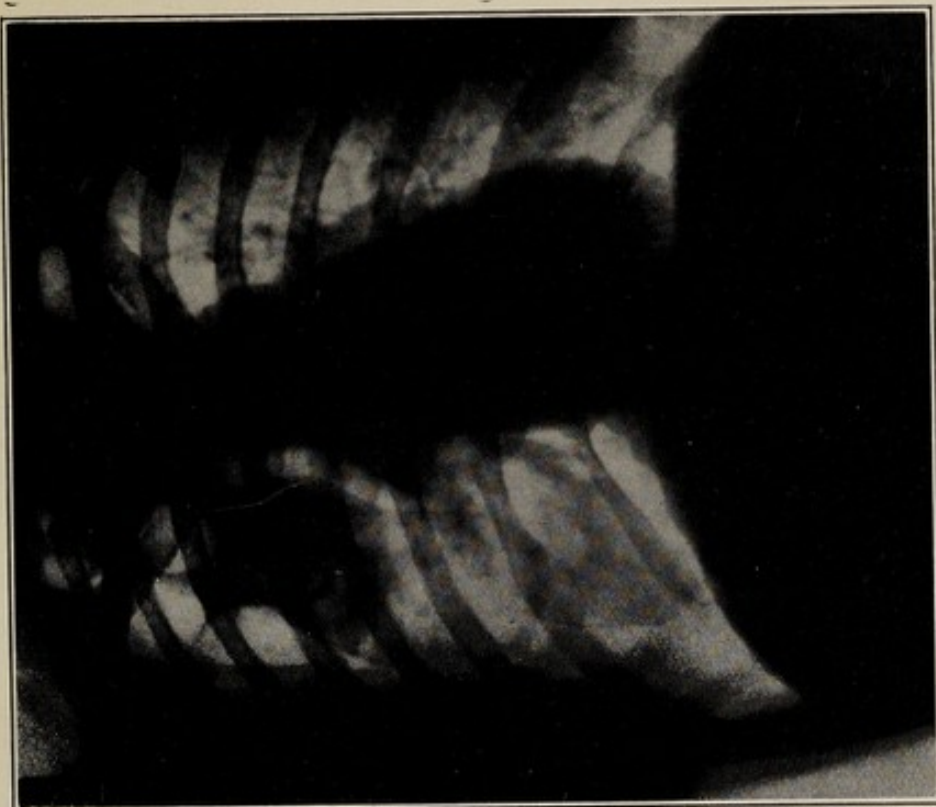
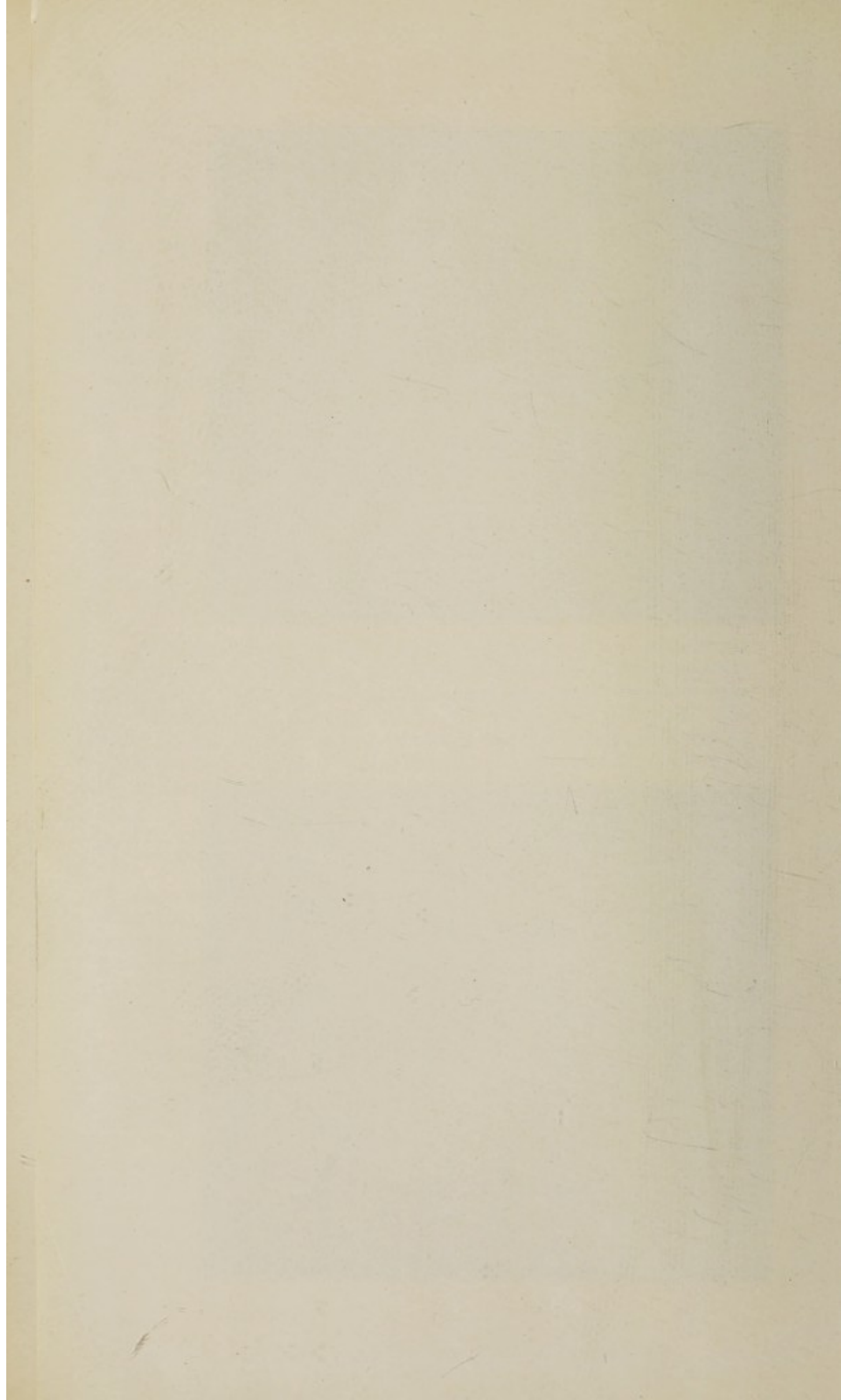


FIG. II.



FIG. I.





**REPORT OF THE STATISTICAL DEPARTMENT.**

The work of the Statistical Department has been carried out on the same lines as in previous years (*see* Annual Reports V, XI and XII). The number of patients discharged from the Sanatorium up to date is 5,869. This number does not include Group IV cases, re-admissions or patients who were in residence too short a time to be included in the records. Those about whom information could not be obtained number 148, or 2.52 per cent.

The statistics of the ultimate results of the enquiry are shown in the following tables :—



TABLE AI.—STATISTICS OF ULTIMATE RESULTS

*Cases in the Sputum of which T.B. were demonstrated in the Sanatorium*  
All cases considered together

Year of Discharge	Number Discharged	Number reported " Well " or " Alive " in each successive year after Discharge:																										Number Dead in 1933	Number lost sight of in 1933	
		1908	1909	1910	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926	1927	1928	1929	1930	1931	1932	1933			
1906/07	125	94	82	73	65	56	42	38	47	46	42	42	38	39	34	36	34	34	33	31	30	30	29	29	28	28	26	95	4	
1907/08	206	—	149	129	112	94	71	72	70	70	75	72	63	59	58	54	54	55	52	50	46	44	44	42	41	41	41	40	160	6
1908/09	205	—	—	154	110	93	70	64	55	64	67	62	60	56	55	52	48	48	47	45	45	43	42	41	41	39	39	39	162	4
1909/10	192	—	—	—	138	112	90	75	69	73	71	69	60	61	56	53	51	49	48	47	43	42	39	37	36	35	34	34	152	5
1910/11	197	—	—	—	—	133	92	88	74	73	72	69	61	56	48	47	47	44	39	38	36	35	32	31	29	29	29	29	162	7
1911/12	198	—	—	—	—	—	111	95	81	76	72	68	55	54	50	46	44	43	40	34	33	32	31	31	31	30	28	160	10	
1912/13	160	—	—	—	—	—	—	113	94	78	75	167	49	52	49	48	45	42	40	35	35	33	33	33	32	29	29	29	129	2
1913/14	177	—	—	—	—	—	—	—	118	84	86	82	75	75	68	60	55	49	47	46	43	43	38	37	37	37	35	35	137	5
1914/15	193	—	—	—	—	—	—	—	—	123	117	104	83	83	75	71	68	61	61	55	53	49	45	44	42	41	40	40	150	3
1915/16	154	—	—	—	—	—	—	—	—	—	105	93	68	65	57	51	48	41	38	35	35	33	30	29	28	26	26	26	125	4
1916/17	212	—	—	—	—	—	—	—	—	—	—	166	127	116	105	99	89	79	74	74	73	69	67	65	64	63	60	149	3	
1917/18	184	—	—	—	—	—	—	—	—	—	—	—	118	115	95	82	80	69	70	62	64	62	58	54	52	51	50	128	6	
1918/19	198	—	—	—	—	—	—	—	—	—	—	—	—	165	136	121	112	102	99	92	86	84	81	79	78	74	71	120	6	
1919/20	196	—	—	—	—	—	—	—	—	—	—	—	—	—	165	140	126	110	100	91	85	81	74	72	70	68	62	131	3	
1920/21	197	—	—	—	—	—	—	—	—	—	—	—	—	—	—	156	141	116	96	89	81	74	73	73	70	69	65	128	4	
1921/22	176	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	150	127	111	92	76	69	62	53	51	51	49	122	1	
1922/23	165	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	135	114	100	89	80	74	67	63	60	54	109	1	
1923/24	166	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	124	112	99	91	81	73	65	63	59	106	2	
1924/25	128	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	106	90	79	72	66	60	52	49	78	2	
1925/26	114	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	97	89	80	73	67	62	61	51	78	2
1926/27	127	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	115	109	101	96	89	84	34	2	
1927/28	121	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	103	94	84	79	74	45	1	
1928/29	118	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	104	90	81	70	41	3	
1929/30	155	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	136	124	41	2	
1930/31	134	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	124	118	18	—	—
1931/32	125	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	116	9	—	—



TABLE A2.—STATISTICS OF ULTIMATE RESULTS  
*Cases in the Sputum of which T.B. were demonstrated in the Sanatorium*  
 Group I considered separately

Year of Discharge	Number reported "Well" or "Alive" in each successive year after Discharge																										Number Dead in 1933	Number lost sight of in 1933	
	1908	1909	1910	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926	1927	1928	1929	1930	1931	1932	1933			
1906/07	30	27	23	21	20	20	15	14	17	17	19	18	16	18	14	15	14	14	14	13	12	12	12	12	12	12	10	2	
1907/08	45	—	43	40	35	31	27	28	30	29	32	32	27	28	27	25	26	26	24	24	24	23	22	22	22	22	21	—	
1908/09	28	—	—	26	23	20	16	16	12	15	15	15	14	14	14	14	13	13	13	13	14	14	14	14	14	14	14	—	
1909/10	43	—	—	—	39	37	34	27	25	29	30	30	25	27	25	25	23	22	22	21	19	17	17	13	12	15	24	3	
1910/11	45	—	—	—	41	47	47	31	28	30	29	30	28	25	22	22	22	20	17	17	17	15	13	10	10	13	31	2	
1911/12	33	—	—	—	—	27	27	21	20	20	20	19	15	16	13	13	12	12	12	10	10	10	10	10	10	10	21	2	
1912/13	15	—	—	—	—	—	—	14	14	12	11	10	9	7	8	8	8	8	6	6	6	6	6	6	6	6	9	—	
1913/14	19	—	—	—	—	—	—	—	17	14	16	17	14	15	13	10	11	11	10	10	10	9	8	8	8	7	10	2	
1914/15	20	—	—	—	—	—	—	—	—	16	17	16	12	13	11	12	12	12	10	10	10	11	10	9	8	7	11	2	
1915/16	16	—	—	—	—	—	—	—	—	—	15	14	11	13	12	11	11	11	11	11	11	11	10	9	8	8	6	2	
1916/17	24	—	—	—	—	—	—	—	—	—	—	24	22	23	22	22	22	20	20	19	18	16	17	17	16	14	9	1	
1917/18	15	—	—	—	—	—	—	—	—	—	—	—	12	14	12	11	11	11	12	12	12	12	11	10	8	8	6	1	
1918/19	10	—	—	—	—	—	—	—	—	—	—	—	—	10	10	10	9	9	9	9	9	9	9	9	9	9	1	—	
1919/20	29	—	—	—	—	—	—	—	—	—	—	—	—	—	29	27	25	26	24	22	20	20	20	20	20	18	11	—	
1920/21	45	—	—	—	—	—	—	—	—	—	—	—	—	—	—	42	30	38	34	34	32	30	29	29	29	28	16	1	
1921/22	25	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	25	23	22	21	21	19	18	15	15	15	10	—	
1922/23	29	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	28	28	27	25	24	22	21	19	18	11	—	
1923/24	22	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	21	20	19	18	17	17	17	17	5	—	
1924/25	15	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	15	13	12	11	10	10	10	4	1	
1925/26	11	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	11	11	10	10	8	9	2	—	
1926/27	22	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	22	21	21	20	19	2	—	
1927/28	15	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	15	15	15	15	13	2	—	
1928/29	13	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	13	12	12	11	1	—	
1929/30	33	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	33	32	31	1	—
1930/31	18	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	18	17	1	—
1931/32	10	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	10	10	—	—







TABLE A4.—STATISTICS OF ULTIMATE RESULTS  
*Cases in the Sputum of which T.B. were demonstrated in the Sanatorium*  
Group III considered separately

[illegible]



TABLE A5.—STATISTICS OF ULTIMATE RESULTS  
*Cases in the Sputum of which T.B. were not demonstrated in the Sanatorium*  
 All cases considered together

Year of Dis- charge	Number Discharged	Number reported "Well" or "Alive" in each successive year after Discharge																										Number Dead in 1933	Number lost sight of in 1933	
		1908	1909	1910	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926	1927	1928	1929	1930	1931	1932	1933			
1906/07	24	23	20	19	19	18	15	14	16	18	19	21	21	19	18	18	18	18	16	17	18	18	16	14	15	16	16	5	7	
1907/08	51	—	49	47	45	40	33	34	35	37	40	39	38	37	35	36	34	34	33	33	32	32	31	30	29	28	27	19	6	
1908/09	66	—	—	57	45	41	33	47	40	38	40	44	43	44	44	42	43	43	43	39	37	39	40	39	38	38	36	25	6	
1909/10	59	—	—	—	54	49	44	48	42	47	49	49	43	43	42	42	42	41	40	39	38	37	36	36	35	35	34	18	6	
1910/11	48	—	—	—	—	42	32	38	37	40	38	37	34	34	33	31	30	32	31	31	30	30	30	30	30	30	26	18	4	
1911/12	48	—	—	—	—	—	36	32	36	34	36	36	29	31	27	27	27	27	27	27	27	27	25	25	25	25	25	20	3	
1912/13	31	—	—	—	—	—	—	29	28	25	28	28	24	26	25	24	25	24	23	23	23	23	22	22	22	22	21	20	9	2
1913/14	41	—	—	—	—	—	—	—	37	31	37	36	33	35	33	32	33	33	34	34	34	32	32	33	32	32	30	7	4	
1914/15	35	—	—	—	—	—	—	—	—	28	30	29	31	24	23	20	22	22	21	20	20	21	20	20	20	20	17	13	4	
1915/16	59	—	—	—	—	—	—	—	—	—	53	51	47	47	44	45	44	43	44	43	42	41	40	37	37	36	36	19	4	
1916/17	58	—	—	—	—	—	—	—	—	—	—	56	53	53	47	50	47	48	48	50	49	49	47	47	47	45	44	12	2	
1917/18	117	—	—	—	—	—	—	—	—	—	—	—	108	105	102	95	98	97	97	98	95	92	89	89	89	85	84	24	9	
1918/19	119	—	—	—	—	—	—	—	—	—	—	—	—	115	112	109	107	104	103	102	101	99	99	96	96	92	92	19	8	
1919/20	78	—	—	—	—	—	—	—	—	—	—	—	—	—	75	74	72	71	68	68	66	65	63	62	61	61	59	18	1	
1920/21	66	—	—	—	—	—	—	—	—	—	—	—	—	—	—	66	66	64	64	63	61	60	62	63	63	62	61	3	2	
1921/22	93	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	92	84	82	81	79	78	75	73	73	71	68	21	4	
1922/23	51	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	46	44	44	43	40	38	36	35	35	35	14	—	
1923/24	68	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	65	63	60	59	58	56	56	55	53	52	14	2
1924/25	72	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	71	68	66	62	62	62	60	59	9	4	
1925/26	70	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	67	67	65	63	63	61	60	59	9	2
1926/27	41	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	39	39	39	39	36	36	4	1	
1927/28	55	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	54	54	50	47	46	8	1	
1928/29	53	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	50	50	48	47	5	1	
1929/30	35	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	33	33	33	2	2
1930/31	44	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	43	42	2	—
1931/32	64	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	62	—	—



TABLE A6.—STATISTICS OF ULTIMATE RESULTS  
*Cases in the Sputum of which T.B. were not demonstrated in the Sanatorium*  
Group I considered separately

Year of Discharge	Number reported "Well" or "Alive" in each successive year after Discharge																										Number Dead in 1933	Number lost sight of in 1933
	1908	1909	1910	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926	1927	1928	1929	1930	1931	1932	1933		
1906/07	16	16	14	14	14	13	10	10	11	13	13	15	14	13	13	14	14	13	14	14	14	12	11	12	12	13	1	
1907/08	31	—	30	29	25	26	23	23	22	24	26	24	24	22	23	23	23	23	23	23	23	22	22	22	21	19	3	
1908/09	39	—	—	36	28	25	19	31	25	23	25	28	27	29	27	28	28	28	26	25	26	27	26	26	25	23	5	
1909/10	42	—	—	—	39	35	32	36	30	34	35	35	33	32	32	31	31	31	30	30	29	28	28	28	27	26	10	
1910/11	37	—	—	—	—	29	25	30	29	31	29	29	27	26	24	24	25	24	24	23	24	24	24	24	24	23	5	
1911/12	26	—	—	—	—	21	22	22	23	20	21	21	20	18	18	18	18	18	18	19	19	19	19	19	19	19	3	
1912/13	19	—	—	—	—	18	—	—	17	16	18	17	14	15	15	15	15	14	14	14	13	13	13	13	13	12	2	
1913/14	28	—	—	—	—	28	—	—	27	21	28	27	25	25	24	25	25	26	26	26	24	24	25	25	25	23	3	
1914/15	17	—	—	—	—	15	—	—	14	13	15	14	9	11	11	12	12	12	11	11	12	12	12	12	12	9	3	
1915/16	32	—	—	—	—	31	—	—	29	—	—	32	29	27	28	27	27	28	29	29	29	28	26	26	26	26	5	
1916/17	34	—	—	—	—	—	—	—	33	—	—	33	31	28	31	29	31	30	32	32	32	29	30	30	30	29	5	
1917/18	51	—	—	—	—	—	—	—	—	—	—	—	47	46	42	44	45	45	46	46	45	44	44	44	44	41	—	
1918/19	35	—	—	—	—	—	—	—	—	—	—	—	—	34	34	33	32	34	33	34	33	32	30	30	31	31	5	
1919/20	50	—	—	—	—	—	—	—	—	—	—	—	—	—	47	48	45	44	43	42	41	41	41	41	41	39	1	
1920/21	48	—	—	—	—	—	—	—	—	—	—	—	—	—	—	50	47	47	46	44	43	45	47	47	47	47	—	
1921/22	51	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	49	48	47	46	46	46	45	45	44	42	2	
1922/23	35	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	33	32	32	31	29	28	27	26	26	26	9	
1923/24	43	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	42	43	42	39	39	39	38	38	37	37	1	
1924/25	49	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	48	46	46	45	45	42	42	40	40	40	4	
1925/26	44	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	43	43	43	43	43	42	41	2	
1926/27	25	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	24	24	24	24	24	24	1	
1927/28	35	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	35	35	33	31	30	1	
1928/29	32	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	32	32	31	30	1	
1929/30	20	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	20	20	20	—	
1930/31	20	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
1931/32	35	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	



TABLE A7.—STATISTICS OF ULTIMATE RESULTS

*Cases in the Sputum of which T.B. were not demonstrated in the Sanatorium*  
Group II considered separately

Year of Discharge	Number Discharged	Number reported "Well" or "Alive" in each successive year after Discharge																										Number Dead in 1933	Number lost sight of in 1933	
		1908	1909	1910	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926	1927	1928	1929	1930	1931	1932	1933			
1906/07	7	6	18	5	5	5	5	4	5	5	6	6	5	5	5	4	10	4	3	3	4	4	4	3	3	3	3	2		
1907/08	18	—	—	15	14	13	10	11	12	13	13	13	13	12	12	10	10	10	10	9	9	9	9	8	8	7	7	2		
1908/09	25	—	—	20	16	13	14	15	14	14	15	15	15	14	14	14	14	14	12	11	12	12	12	12	12	12	12	1		
1909/10	15	—	—	—	13	11	10	10	11	12	12	9	9	9	9	9	9	8	8	8	8	8	8	8	8	8	8	1		
1910/11	10	—	—	—	—	8	8	8	8	9	9	7	7	7	7	7	7	7	7	7	6	6	6	6	6	5	4	1		
1911/12	20	—	—	—	—	—	14	9	12	13	14	8	10	9	8	8	8	8	8	8	8	8	6	6	6	6	6	11	3	
1912/13	9	—	—	—	—	—	—	—	—	—	8	8	8	8	6	7	7	7	7	7	7	7	7	7	7	7	7	2	—	
1913/14	11	—	—	—	—	—	—	—	9	9	8	7	8	7	7	7	7	7	7	7	7	7	7	7	6	6	4	1	1	
1914/15	14	—	—	—	—	—	—	—	—	—	13	10	9	10	8	9	9	14	14	12	11	9	8	8	8	8	8	5	1	1
1915/16	23	—	—	—	—	—	—	—	—	—	19	16	15	16	15	15	15	17	18	18	17	17	18	17	10	9	9	11	3	
1916/17	24	—	—	—	—	—	—	—	—	—	23	22	20	19	19	18	18	17	17	17	43	41	41	41	41	40	39	16	4	
1917/18	59	—	—	—	—	—	—	—	—	—	—	55	51	50	48	48	47	47	47	62	61	63	63	62	61	57	57	9	5	
1918/19	71	—	—	—	—	—	—	—	—	—	—	—	68	67	68	68	66	64	64	19	19	18	18	18	17	17	17	3	—	
1919/20	20	—	—	—	—	—	—	—	—	—	—	—	—	20	20	20	20	18	19	19	19	19	13	12	12	11	10	2	2	
1920/21	14	—	—	—	—	—	—	—	—	—	—	—	—	—	14	14	13	13	13	26	25	22	21	21	21	20	19	7	2	
1921/22	28	—	—	—	—	—	—	—	—	—	—	—	—	—	—	28	26	27	27	7	7	6	6	5	5	5	5	4	—	1
1922/23	9	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	8	7	7	7	7	6	6	5	5	5	5	4	—	1
1923/24	15	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	14	14	14	14	14	14	14	13	13	13	1	1	
1924/25	18	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	18	18	17	16	16	16	16	16	16	2	—	—
1925/26	19	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	19	17	17	15	14	14	14	5	—	—
1926/27	11	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	10	10	10	10	9	9	1	—	—
1927/28	18	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	17	17	17	15	14	14	4	—	—
1928/29	19	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	3	—	—
1929/30	14	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
1930/31	22	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1	—
1931/32	27	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1	—







TABLE BI.—STATISTICS OF ULTIMATE RESULTS

*Cases in the Sputum of which T.B. were demonstrated in the Sanatorium*

Condition on		Discharged during the Year																				Condition in 1933						
Admission	Discharge	1906/07	1907/08	1908/09	1909/10	1910/11	1911/12	1912/13	1913/14	1914/15	1915/16	1916/17	1917/18	1918/19	1919/20	1920/21	1921/22	1922/23	1923/24	1924/25	1925/26	1926/27	1927/28	1928/29	1929/30	1930/31	1931/32	Alive Dead Lost sight of
		8 6 2	9 12 2	12 2 —	4 8 1	5 6 —	5 8 1	3 5 —	3 4 —	3 5 1	5 3 —	8 4 —	— 2 1	3 — —	10 1 —	21 2 1	9 4 —	11 6 —	11 — —	7 2 1	7 1 1	10 — —	10 — —	8 1 —	28 1 —	14 — —	7 — —	
Group I	Disease Arrested	4 9 —	11 6 —	2 9 —	11 11 1	7 20 1	4 12 1	3 3 —	4 4 1	4 4 1	1 4 1	7 2 —	6 3 —	5 — 1	8 7 —	7 12 —	6 5 —	8 4 —	4 4 —	2 — —	— 1 —	6 1 —	2 — —	1 — —	3 — —	— — —	2 — —	Alive Dead Lost sight of
	Much Improved	— — —	— — —	— — —	— — —	— — —	— — —	— — —	— — —	— — —	— — —	— — —	— — —	— — —	— — —	— — —	— — —	— — —	— — —	— — —	— — —	— — —	— — —	— — —	— — —	— — —	— — —	
	Improved	— — —	2 1 —	— 1 —	— — —	— 3 1	— 1 1	— — —	— — —	— 1 —	— 1 —	— — —	— 1 1	1 — —	1 — —	2 1 —	— 1 —	— 1 —	— — —	1 1 —	1 1 —	1 — —	4 1 —	1 — —	2 — —	1 — —	2 — —	
Group II	Stationary or Worse	— 1 —	— 2 —	— 2 —	1 2 —	— 4 —	1 1 —	— 1 —	1 1 —	1 — —	2 — —	— 1 1	1 — —	1 — —	— — —	— — —	— — —	— — —	1 — —	— 1 —	— — —	— — —	— — —	2 — —	— — —	2 — —	— — —	Alive Dead Lost sight of
	Disease Arrested	3 3 —	— 3 —	8 4 1	6 7 1	6 9 2	9 11 1	8 15 —	5 9 1	5 8 1	2 5 —	5 5 —	2 3 —	8 — —	8 1 —	8 4 —	4 4 —	7 3 —	8 2 —	6 4 —	5 — —	15 1 —	14 2 —	17 4 —	18 1 —	12 — —	19 — —	
Group III	Much Improved	9 22 1	15 30 3	12 23 2	10 34 —	6 42 3	6 38 1	11 25 1	15 33 2	17 37 —	5 31 —	29 35 1	23 30 2	33 30 2	17 30 1	14 27 2	11 21 —	8 9 —	6 11 1	17 10 —	11 2 —	16 3 —	18 4 —	13 5 —	23 3 —	27 1 —	24 — —	Alive Dead Lost sight of

Group	Improved																					Alive Dead Lost sight of							
		1	2	3	1	3	2	4	1	8	13	1	1	2	7	3	4	1	1	4	15	4	12	21	14	27	31	29	22
Group I.	Improved	11	15	1	1	23	1	12	1	1	8	4	1	1	13	9	—	—	—	—	—	—	7	4	5	9	3	—	—
	Stationary or Worse	6	18	—	1	18	4	18	1	3	2	18	—	—	—	1	10	9	1	—	—	3	4	5	7	12	25	15	
	Disease Arrested	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	2	4	4	2	7	1	—	1	—	—	—	1	
	Much Improved	2	1	—	2	9	3	19	6	6	—	6	—	—	—	8	27	27	8	23	4	9	1	1	4	—	1	—	2
Group III.	Improved	10	2	—	—	17	2	17	13	—	2	10	17	—	1	26	21	19	1	2	9	10	11	7	6	5	3	5	13
	Stationary or Worse	—	—	—	1	23	3	32	—	1	1	—	—	—	—	3	2	—	—	—	4	—	—	1	14	2	4	8	8
	Summary	28	41	39	29	35	41	30	30	30	37	36	49	26	63	146	51	63	52	62	89	79	82	79	35	124	124	114	
	Summary	93	159	162	161	152	136	128	158	128	128	136	149	126	125	124	102	75	50	36	41	35	41	35	31	10	9	—	
TOTAL	125	206	205	192	197	198	177	193	154	212	184	198	196	197	176	165	166	128	114	127	121	118	155	134	123	134	155	123	



TABLE B2.—STATISTICS OF ULTIMATE RESULTS

*Cases in the Sputum of which T.B. were not demonstrated in the Sanatorium*

Condition on Admission	Discharge	Discharged during the Year																				Condition in 1933							
		1906/07	1907/08	1908/09	1909/10	1910/11	1911/12	1912/13	1913/14	1914/15	1915/16	1916/17	1917/18	1918/19	1919/20	1920/21	1921/22	1922/23	1923/24	1924/25	1925/26		1926/27	1927/28	1928/29	1929/30	1930/31	1931/32	
Group I	Disease Arrested	11 2 1	17 5 3	20 9 4	24 8 6	22 11 2	18 7 —	10 2 2	6 — —	6 1 —	25 5 —	18 2 —	34 5 2	23 2 1	34 5 —	44 1 —	42 5 —	21 6 —	31 5 —	32 3 3	32 2 1	22 1 —	24 2 1	24 — —	18 — —	17 — —	33 — —	Alive Dead Lost sight of	
	Much Improved	2 — —	4 1 —	2 1 —	2 — —	1 — —	— — —	— 2 —	17 2 —	4 4 —	1 — 1	12 2 —	7 — 1	7 — 1	2 3 1	1 — —	— — 2	4 — —	5 — —	7 2 1	4 — —	— — —	3 1 —	4 — 1	1 — —	— — —	2 — —	Alive Dead Lost sight of	
	Improved	— — —	— 1 —	2 — —	— 1 —	— — —	1 — —	— — —	2 — 1	— — —	— — —	— — —	1 — 1	— — —	— — —	4 — —	2 — —	2 1 —	1 1 —	1 — —	4 — —	1 — —	— — —	3 — —	2 — —	1 — —	— — —	— — —	Alive Dead Lost sight of
	Stationary or Worse	— — —	— — —	1 — —	1 — —	— — 1	— — —	3 — —	— — —	— — —	— — —	— — —	— — —	— — —	1 — —	1 — —	— — —	— — —	— — —	1 — —	— — —	1 — —	1 — —	1 — —	— — —	— — —	1 — —	— — —	— — —
Group II	Disease Arrested	2 2 1	4 3 1	5 2 1	4 2 —	4 2 —	2 4 3	3 1 —	1 1 —	1 — —	6 5 1	6 3 —	10 6 3	21 4 2	9 3 —	8 2 1	17 4 1	3 4 —	8 — 1	9 — —	7 4 —	4 1 —	9 1 —	6 2 —	5 1 —	14 — —	15 1 —	Alive Dead Lost sight of	
	Much Improved	1 — 1	2 5 1	3 6 —	3 4 1	— 2 1	4 5 —	1 1 —	1 2 1	7 3 1	1 3 1	7 3 1	24 3 1	26 3 4	3 — —	1 — —	2 1 —	— — —	3 — —	5 — —	3 — —	3 — —	3 1 —	3 — —	2 — —	5 — —	4 — —	Alive Dead Lost sight of	

[illegible]



## TUBERCULOSIS OF THE LARYNX AND ARTIFICIAL SUNLIGHT TREATMENT.\*

BY

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Some years have passed since the therapeutic use of artificial light—violet rays, ultra-violet light, etc.—reached what we may call its “boom” period. In early days some investigators promptly followed, with brilliant results, the sage advice of the French savant in regard to new remedies: “Hâtons-nous de les utiliser pendant qu’elles sont encore efficaces.” But in certain common conditions—such as debility in children, catarrh, the common cold, rheumatism, etc.—where good results might have been looked for, reports have been available for some time, and are mostly disappointing.

In a disease so slow in complete healing and so kaleidoscopic in its behaviour as tuberculosis, an investigation must necessarily take a long time. It is also difficult to assess the value of any new form of treatment which has to be carefully compared with the well-established results of sanatorium methods and the reliable assistance of the galvano-cautery and thoracic surgery. Seven years have therefore elapsed since the consulting medical staff recommended the council of King Edward VII Sanatorium to install the necessary outfit at Midhurst. This advice was based on the encouraging reports received from various sources. The light treatment at that time was warmly recommended in tuberculosis of the larynx, and it was claimed that as many as 55 per cent. of cures could be obtained by employing this remedy. As our own efforts, based on the first ten years’ experience of 477 cases under the best sanatorium conditions, (1) had only allowed us to claim 25 per cent. of cures in all cases, we were naturally anxious to test a method recommended by esteemed authorities in several countries. I do not propose to sketch the history of the method nor to supply a bibliography, although I have carefully studied both, for, unfortunately, my own experience at Midhurst has failed to confirm the earlier commendations.

\* Read in the Section of Tuberculosis at the Centenary Meeting of the British Medical Association, London, 1932.

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## EQUIPMENT AND TECHNIQUE.

In a comfortable, well-warmed room two couches were arranged with lamps between them, so that two patients could share the light rays at the same time. Communicating with this room was a dressing room, equipped with a douche. The carbon lamps, obtained from Copenhagen, were exactly similar to those used and recommended in the Finsen Institute. The total cost of the installation was £518 19s. 4d., of which the structural alterations cost £188 1s. 8d. These figures are given to show that no expense was spared by the council in supplying the necessary armamentarium, and also so that other institutions may have some idea of what the expenditure is likely to be.

To feel assured that we not only had satisfactory and adequate appliances, but also that they were properly employed, I paid a visit to the Finsen Institute, and our medical superintendent, Dr. R. R. Trail, made a special journey to Copenhagen. Like myself, he was cordially and generously received by Dr. Strandberg, who did everything possible to help us in understanding the method of employing the treatment. To make doubly sure of this, a Danish nurse from the laryngological clinic of the Institute paid a visit of some weeks to Midhurst to instruct one of our nurses in the details of technique. In addition, during his visit to England in 1926, Dr. Strandberg very kindly came down to the sanatorium, and expressed himself as quite satisfied with our arrangements. We feel fairly confident, therefore, that the treatment had a trustworthy trial so far as equipment was concerned. I do not think it is necessary to go into details as to the particular lamps used, the strength of light employed, the length of exposure, the frequency of the baths, etc. We have followed the methods advised by the Danish authorities.

## CASES SELECTED FOR LIGHT TREATMENT.

The first light treatment at Midhurst was given on November 18th, 1926. The present report deals with cases between that date and 1929, and includes all cases so treated during the three years. No case has been included which left the sanatorium after November, 1929. The list was then closed so as to enable us to trace the history of all these patients during two years after their discharge. In these three years, thirty-two cases of laryngeal tuberculosis were selected for trial; sixteen were males and sixteen females. These were chosen as suitable because they were favourable as regards (a) the situation in the larynx, (b) clinical nature of disease, (c) record of steady temperature, (d) condition of the lungs, (e) satisfactory type of patient, and (f) the indications of favourable resistance.

As evidence of the promising situation and limited extent of laryngeal disease, it was recorded that in no fewer than eleven instances (one-third of the group) there was no change in the voice. The discovery that there was a throat lesion was made owing to our



custom of examining the upper air passage of every patient on admission. The laryngeal disease had not caused any voice change, because it had left unaffected both vocal cords and the posterior commissure stretching between them. Complete normal glottic closure had therefore been unimpaired, for in these cases the lesions had occurred above the level of the closed glottis, and consisted generally of limited and often unbroken deposits in the interarytenoid area, or in the region above the vocal processes—very favourable locations.

In all the thirty-two cases the appearances were those of a fairly quiescent type. No case was submitted to light treatment until voice rest (whispers or silence) and the general sanatorium treatment had shown that there was no activity, and that local as well as general conditions warranted the opinion that the case was well within the expectation of cure. Rectal temperature, morning and evening, was first charted for some weeks. Although some supporters of light treatment have recommended its employment even with pyrexia, urging that it would reduce fever, we have never been able to bring ourselves to disregard this valuable symptom as an indication for strict rest and a warning against any activity, physical or mental. This guiding principle was only strengthened by our experience in some of the cases, where each attempt to apply light treatment was checked by the onset of pyrexia. Needless to say, the treatment was never tried with patients undergoing strict (bed) rest.

#### LOCALITY OF LARYNGEAL LESIONS.

In the cases in which light treatment was given the laryngeal disease was generally early and limited, and, in the majority of cases, intrinsic—that is, the disease was in the interarytenoid area, or the cords or the ventricular bands. In no case was the crico-arytenoid joint invaded, and in no case was there any dysphagia. It was employed in only five extrinsic cases—three males and two females, in whom the epiglottis was invaded by a lupoid type of disease. In one of these light was discontinued owing to pyrexia, and the lupoid appearance took on a miliary form, the patient dying six months later. In one there was no improvement, and the epiglottis broke down six months later. In another no improvement took place, and the galvano-cautery had to be employed; this resulted in healing, which has now remained complete for three years. The fourth case also required the cautery before a cure could be obtained, and the fifth—a man of 56 with a small lupoid deposit on one side of the epiglottis—healed without other treatment.

All the patients willingly accepted the advice to try the light baths. They knew, by the tradition at the sanatorium, that "throat cases were longer" than the average pulmonary case, and they would gladly shorten the period of irksome silence. The



method of treatment was far from unpleasant, and the Press, both lay and medical, was at that time very enthusiastic in recommending its benefits. These points are mentioned to indicate that many factors in suggestion were at work to further the therapeutic value of the treatment. These thirty-two cases were selected as being of the extent and type in which we had been accustomed, from twenty years' experience, to anticipate complete healing under the sanatorium regime, with the addition of voice rest and, in some cases, of the galvano-cautery. We therefore looked forward with considerable confidence to being able to support the claim of more certain and rapid healing with the added help of light treatment.

#### RESULTS.

The results have caused us much disappointment. We found that the treatment may be harmful, that only in a very small number of cases could any benefit be attributed to it, and that few of the thirty-two patients became enamoured of it or were anxious to persevere after an adequate trial.

In the results displayed in figures we have an example of how misleading unanalysed statistics may be. Judged by final result alone a successful case might be made out in favour of light treatment, whereas an analysis of the figures clearly demonstrates what an ineffective addition it is to sanatorium methods.

Condition worse	..	..	..	1
Condition <i>in statu quo</i>	..	..	..	3
Condition improved	..	..	..	4
Condition cured	..	..	..	24
				—
				32
				—

To obtain twenty-four cures in thirty-two cases (75 per cent. of success) might be claimed as a much higher proportion than the average. As already stated, during a ten years' experience at Midhurst the average of cures in all cases of laryngeal disease only amounted to 25 per cent. But that record was obtained in a series of 475 unselected cases, and in 103 of them chosen as suitable for the galvano-cautery we obtained 64·08 per cent. of cures. (2) When, therefore, we study the cures resulting in the twenty-four out of thirty-two cases submitted to light treatment we must consider the other factors which were at work. (a) All the cures were in patients selected as "favourable" as regards both local and general conditions. (b) In certain cases no improvement was seen after a trial, sometimes extending over five months, with the regular use of a bath of as much as thirty minutes' duration, given daily except on Sunday. (c) In several instances the baths had to be abandoned owing to loss of weight, or to their being followed by pyrexia or fatigue. (d) Healing took place later, in some cases three months and longer after the light had been discontinued. (Figs. 1 and 2.)



(e) In eleven cases there was no improvement, or progress was so slow that the galvano-cautery was employed; healing was then secured in all the eleven cases. (Figs. 3, 4 and 5.) (One case had, in addition, an artificial pneumothorax.) (f) In three cases an artificial pneumothorax was performed. We have previously shown that a well-marked case of laryngeal tuberculosis, unaltered or worse after some months of silence, may be completely healed three months after the performance of an artificial pneumothorax. (3) (g) Deducting all such cases, we find that there were only seven out of the twenty-four cures in which, in addition to sanatorium regime and voice rest, light was the only other treatment.

#### TEST CASES.

The most rapid healing occurred in three months. The patient was a woman of 41, with a unilateral pulmonary lesion, chiefly pleuritic. (Fig. 6.) In the second case a cure was effected in five months—not a rapid result. The patient was on whispers all the time (there was no voice change), the lesion being a limited interarytenoid deposit. The third case was well in four months. The laryngeal lesion was limited, superficial, and one-sided, but the patient lost weight while undergoing the treatment, and his larynx relapsed afterwards. The treatment appeared to suit the larynx in the fourth case; it was healed in six months, but the patient lost weight, and left to have a pneumothorax performed elsewhere.

The larynx had not healed at the end of four months in the fifth case, a man of 32, with an irregular interarytenoid deposit, although tubercle bacilli had disappeared from his sputum, and his pulmonary signs (chiefly pleuritic) showed arrest. Three months later the larynx was clear. In the sixth case, a man of 56, only the epiglottis was affected with a lupoid infiltration. The disease was still present after six months of light treatment, although tubercle bacilli had disappeared and the lung disease was arrested. Four months later, without further treatment, the epiglottis had healed. The seventh case was also a lupoid case. The patient soon lost his tubercle bacilli, and left the sanatorium at the end of five months with the larynx much improved. Three months later it was healed, but the laryngeal disease recurred two years later, and again healed, this time without light baths or treatment other than voice rest and sanatorium regime. (Fig. 7.)

#### CONCLUSION.

In thirty-two favourable cases there were no striking evidences of benefit from light treatment; in only two or three might some help from it be claimed. Nor can it be said that healing of laryngeal tuberculosis was hastened, or that the course of light baths in any way rendered subsequent cure by the cautery more rapid or more certain. Quite as good results have been obtained, and just as



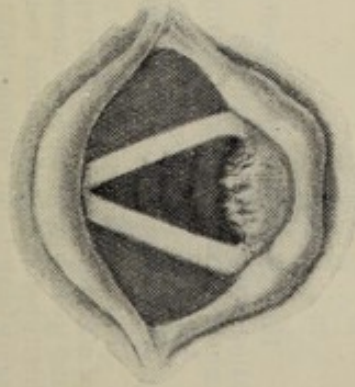


FIG. 1.

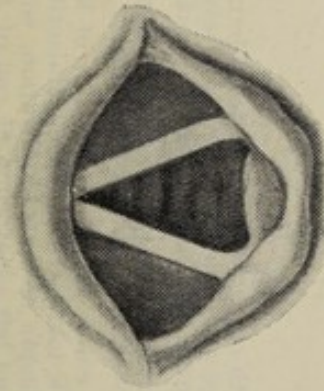


FIG. 2.

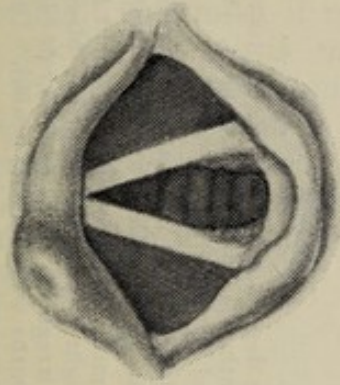


FIG. 3.

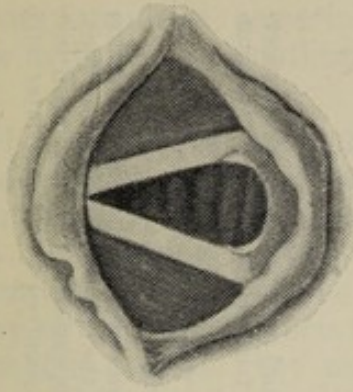


FIG. 4.

FIG. 1.—Typical interarytenoid abraded pyramidal deposit. Treatment by silence and artificial pneumothorax. Light treatment suited the patient, and had no ill effects on temperature; tubercle bacilli disappeared from sputum. After eight months' stay in sanatorium the deposit was still prominent.

FIG. 2.—Same as Fig. 1. A year after leaving sanatorium, without further treatment, the deposit became reduced and fibrosed.

FIG. 3.—Indolent ulcerating deposit over each vocal process and in subglottic area below; lupoid infiltration of right half of epiglottis with indolent shallow ulcer on right margin. Seven months of silence and light treatment: no pyrexia; gain in weight; patient enjoyed baths; little or no improvement in larynx.

FIG. 4.—Same as Fig. 3. One treatment with the galvano-cautery was followed, in two months, by complete cicatrization, although tubercle bacilli remained present in the sputum.



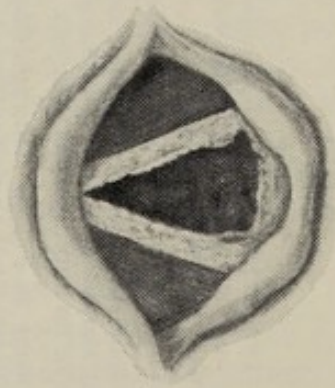


FIG. 5.

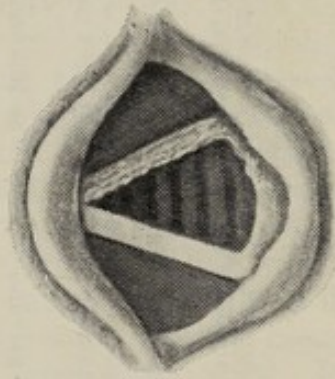


FIG. 6.

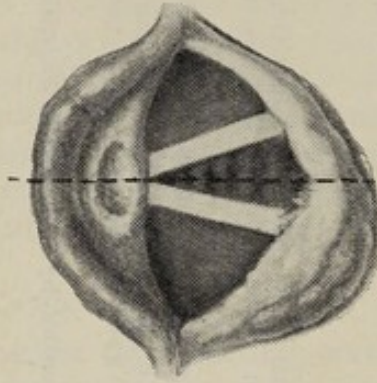


FIG. 7.

FIG. 5.—Ulcerating deposit of both cords, with some pachydermia-like deposit over both vocal processes, and superficial, irregular, ulcerating interarytenoid deposit. Silence and light treatment for seven months without improvement. Three treatments with the galvanocautery resulted in cure in three months, and healing has been maintained for three years.

FIG. 6.—An interarytenoid deposit, with the whole of the left cord infiltrated and ulcerated. Response to light treatment satisfactory; gain in weight; no pyrexia during the three months of treatment, and the rapid healing appeared to be expedited by the light baths.

FIG. 7.—No voice change; both cords sound. Right side of larynx much impaired in movement through extensive lupoid infiltration of all right arytenoid and aryepiglottic fold, with ulcerating stalactites in right interarytenoid area. Margin of the epiglottis red and swollen, and its laryngeal surface showed a deeply ulcerated infiltration, with an irregular, dirty grey, crater-like appearance. Patient soon lost his tubercle bacilli, gained weight, and left sanatorium at end of five months with larynx healed. Disease recurred two years later and again healed, but without light or treatment other than voice rest and sanatorium principles.

swiftly, with voice rest, sometimes supplemented with the galvano-cautery or artificial pneumothorax, and, in all cases, the sanatorium regime.

The whole picture of tuberculosis is so remarkably changed for the better under sanatorium conditions that many remedies which appear to be beneficial under ordinary hospital or home conditions are found to add nothing to the improvement wrought by hygienic living in unvitiated air. Hence the number of "negative findings" with many new remedies when tried in a sanatorium. Under other conditions it is possible they may be of help—by suggestion if not otherwise. The constant medical supervision and control available at Midhurst has enabled us to see the possible drawbacks, and even dangers, of light treatment if not carefully and regularly watched. Since the above series was ended in November, 1929, we have continued to try this remedy in well-selected cases, and the conclusion still is that, while it may appear to be of help in a very few cases, it probably acts only by suggestion; that it is fraught with danger if not scrupulously supervised; and that, on the whole, in patients in a well-ordered sanatorium it is no addition to the treatment at present in use.

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