

CANCER AND OTHER CAUSES OF DEATH IN GLASGOW ROYAL INFIRMARY.

BY JOHN STEVEN FAULDS, M.B., CH.B. (EDIN.).

(*From the Department of Pathology, Glasgow Royal Infirmary.*)

(With 1 Graph.)

RECENTLY conflicting statements have been published in various countries on the prevalence and increased mortality from cancer, *i.e.* malignant disease in general. Statistics show a definite upward trend in the annual death rate from cancer, but opinions differ as to whether the increased mortality represents the actual increase in the incidence of the disease or is explained by such factors as the increased average age at death, improved methods of diagnosis and more careful records of the cause of death.

Recently interest has been focussed mainly on cancer of the respiratory tract and publications by various workers in different countries have demonstrated an increase in the percentage of intra-thoracic malignant disease, both clinically and at *post-mortem*, especially over the last few years.

With a view to ascertaining how the figures for the Glasgow Royal Infirmary compared with the published statistics of other institutions, I have investigated *post-mortem* records for the last 36 years and studied in particular the question of malignant disease of the respiratory tract. In that period there have been 12,549 sections, and malignant disease was present in 1466 of these. I have investigated more exhaustively the records from 1909 to 1928, and those from 1893 to 1908 in less detail.

In 1909 Prof. Teacher was appointed as pathologist to the Royal Infirmary and was given an adequate staff. Thereafter, microscopic examination of every tumour was made and the sections filed, so that they still can be referred to.

Prior to that year the diagnosis was sometimes not supported by microscopic examination and consequently doubt could be cast upon the accuracy of the naked-eye findings. For example, the addition of one or two lymphadenomata to the returns of any year would vitiate the percentage for the year when the numbers are small.

In dealing with the records from a large general hospital over a long period and in trying to draw conclusions from them, numerous fallacies are liable to appear, and must be taken into consideration in a critical analysis. Attention, however, may be drawn to the following features:

The admission rate has increased threefold from 5193 in 1893 to 15,799 in 1928, and the death rate only 2·2-fold from 500 to 1146 in the same period. *Post-mortems* have not kept up the same ratio to the death rate, owing partly

to the increasing difficulty of obtaining permissions. Again, the class of patient in hospital is changing; originally it was the poor and uneducated; now it is chiefly the lower middle class who are relatively intelligent and educated, particularly in regard to bodily ailments. For example, one rarely sees nowadays the large fungating carcinomata, while small epitheliomata of the tongue and lip amenable to excision or local treatment are commonly seen.

Accidents also largely influence our admission figures as do operations such as herniotomies and appendicectomies with their relatively low mortality. From 1893 to 1923 approximately 10 per cent. of the admissions died, but since then the mortality has been steadily falling and this is attributable to the factors mentioned above. For these reasons, when I analysed the *post-mortem* records, I did not select malignant disease alone but made a classification of the commoner causes of death.

The *post-mortem* incidence in a general hospital of certain diseases has changed greatly, due for example to the segregation of all tuberculosis and most of the pneumonia cases in the City hospitals. Syphilis, likewise, is no longer treated in the Royal Infirmary, and, as a rule, is more efficiently treated than formerly, so that there are fewer aneurisms and cerebral gummata. Cases of cancer of the breast and uterus rarely come to *post-mortem*. Apart from the fact that the diagnosis is more obvious in these cases and *post-mortem* examinations less essential, there are the additional factors that patients with cancer of the breast die at home after operation, while uterine cancers die either at home or in the Cancer Hospital whither they have been referred. While, therefore, *post-mortem* statistics are not an ideal method of estimating the frequency of malignant disease, if studied in conjunction with the percentage of other diseases coming to autopsy, some information may be gained for comparison with similar statistics published elsewhere.

In studying the tables that follow it is well to remember that the figures give the percentage of sections in which a disease is present but is not necessarily the immediate cause of death. For example, some of the gastric and duodenal ulcers show a coincident peritonitis or cirrhosis of the liver, and quite a few of the primary carcinomas of the liver had an associated cirrhosis.

Under the tuberculosis column are included only acute tubercular infections causing death. Latent tubercle is not included. Under endocarditis are classified only those cases which show acute valvular lesion or recent exacerbations superimposed upon a chronic lesion. Chronic sclerosing endocarditis or old vegetative lesion are classified under valvular disease of the heart. Simple dilatation of the ring is not included as a pathological lesion. Under peritonitis and meningitis are included both tubercle and sepsis since there are not great variations from year to year and a better general picture is obtained by combining the figures.

The classification of nephritis is exceedingly difficult, and since it is present in so many cases as a secondary factor I have not included it at all in this statistical enquiry.

Table I. Percentage of diseases to post-mortems.

Year	Deaths	Post-mortems	Ulcer: gastric or duodenal	Appendicitis	Pernicious anaemia	Cirrhosis of liver	Pneumonia	Coronary stenosis	Endocarditis	Valvular disease of heart	Syphilitic aortitis	Peritonitis	Tuberculosis	Meningitis	Cerebral thrombosis or haemorrhage	Accidents
1893	500	217	1.4	2.3	1.8	0.14	8.8	—	3.2	10.0	2.3	6.0	12.0	5.5	6.5	20
1894	540	177	1.1	2.2	1.7	1.1	6.2	1.7	1.7	5.6	1.1	6.2	16.0	4.5	4.5	17
1895	579	225	1.3	1.8	0.44	6.6	8.9	1.3	1.3	10.0	1.3	6.6	10.0	4.8	3.5	16
1896	599	247	0.4	3.6	2.0	1.2	7.4	2.8	3.3	1.2	4.0	7.7	12.0	4.0	4.0	12
1897	645	292	1.7	1.3	0.3	3.1	7.2	2.1	4.2	7.2	2.7	8.2	10.0	5.5	5.1	14
1898	680	313	2.9	2.5	0.96	2.2	14.0	1.0	2.2	9.3	3.2	7.7	11.0	4.1	3.7	15
1899	720	414	1.9	1.0	0.72	2.7	8.0	1.9	4.8	8.3	2.6	5.8	9.7	3.9	4.8	21
1900	691	375	2.1	1.4	0.8	1.6	7.5	0.26	4.8	5.3	2.6	8.8	11.0	1.1	2.6	23
1901	717	279	2.1	2.8	1.1	1.1	11.0	1.1	2.2	5.0	3.2	11.0	8.5	5.0	4.2	21
1902	771	317	2.2	1.3	0.3	0.95	10.0	0.32	3.8	8.0	1.6	11.0	7.6	2.9	4.8	17
1903	765	332	1.8	2.1	—	2.4	10.0	1.8	2.1	5.7	1.2	7.0	8.2	4.5	5.1	15
1904	754	299	4.3	3.3	0.33	1.3	9.6	1.7	3.3	7.3	2.6	10.0	5.0	3.0	8.3	16
1905	841	352	2.8	2.5	0.8	1.1	10.0	0.57	2.5	3.7	0.85	8.0	6.4	5.7	8.8	13
1906	953	439	3.6	5.2	0.22	0.45	10.0	0.44	5.2	4.3	2.1	12.0	8.0	5.3	4.6	13
1907	843	438	2.5	2.1	0.69	2.1	11.0	0.69	2.5	6.4	1.6	8.0	8.9	7.1	6.4	16
1908	895	426	3.5	3.1	0.47	2.1	9.9	0.94	2.8	5.4	1.4	11.0	8.0	2.3	9.7	14
1909	894	402	3.5	4.3	0.25	1.2	12.0	1.5	7.0	8.5	2.5	11.0	4.7	4.7	5.0	11
1910	862	347	3.5	0.87	0.58	1.4	10.0	2.3	8.4	6.7	4.1	7.3	4.1	5.5	5.2	8
1911	917	384	3.4	2.7	1.2	1.5	9.0	0.6	6.3	6.0	4.2	12.0	3.0	8.1	6.3	12
1912	893	383	3.4	1.3	1.3	2.3	11.0	2.3	8.3	7.0	3.9	8.1	3.9	7.5	4.7	13
1913	931	319	7.4	3.9	0.97	2.9	16.0	2.2	7.4	3.2	2.6	12.0	5.8	4.5	6.7	15
1914	996	348	4.9	3.7	0.86	1.7	7.4	3.2	6.9	4.0	4.9	10.0	1.7	1.1	3.2	18
1915	1058	381	2.9	4.4	1.0	1.3	13.0	2.6	8.4	4.2	3.4	10.0	3.6	7.6	7.6	18
1916	1051	378	2.8	4.2	1.3	1.6	12.0	2.3	3.6	10.0	7.6	11.0	3.2	1.3	8.6	13
1917	1037	311	2.5	1.9	1.6	2.2	6.4	5.8	4.5	8.8	4.4	7.4	2.9	5.5	8.0	17
1918	1141	332	4.8	6.2	0.31	1.5	15.0	3.1	3.1	5.8	4.0	13.0	4.0	6.2	6.2	18
1919	990	352	3.1	7.8	0.57	2.4	9.4	2.5	4.2	6.8	2.8	11.0	1.9	5.7	8.2	19
1920	1053	339	3.8	6.5	1.2	1.8	15.0	2.1	5.6	2.3	2.1	16.0	3.2	4.4	6.2	18
1921	1005	385	5.4	2.8	1.2	1.3	8.8	3.2	6.4	2.6	2.1	8.3	5.7	4.9	7.5	16
1922	921	345	5.2	4.9	0.29	1.7	9.0	2.3	6.9	4.1	4.3	13.0	0.87	2.9	9.8	15
1923	942	327	3.8	5.1	0.90	1.9	11.0	3.0	4.8	2.1	5.1	9.7	3.0	5.8	6.9	16
1924	1050	351	5.9	5.9	1.7	3.4	9.0	2.8	6.2	2.2	2.2	10.0	3.7	7.4	6.5	17
1925	1020	389	4.6	4.6	1.1	1.6	7.4	2.8	7.4	4.4	3.3	9.2	2.1	3.1	6.7	18
1926	1038	457	8.5	4.1	1.5	1.3	9.6	5.5	6.8	2.6	2.2	10.0	3.7	2.6	5.3	22
1927	1124	484	5.8	2.4	1.1	1.6	7.5	6.1	7.3	2.2	5.5	6.7	2.6	3.1	7.4	21
1928	1146	443	7.0	4.1	0.22	2.7	8.3	4.2	5.7	6.1	3.8	8.3	3.3	4.9	5.6	17

ANALYSIS OF THE COMMON CAUSES OF DEATH.

From an analysis of the records of the commoner causes of death, the following general inferences may be drawn. The percentage of gastric and duodenal ulcers coming to autopsy has increased markedly, particularly during the last ten years. This increase is not attributable to a greater mortality but directly dependent on the marked increase in the admissions of cases of gastric and duodenal ulcer within recent years (see Table II). Appendicitis also shows a steady rise with a maximum peak about 1918 to 1920.

Table II. *Total number of cases treated annually: extract made from the G.R.I. annual reports.*

	1893	1909	1918	1919	1920	1921	1922	1923	1924	1925	1926	1927	1928
ndicitis	8	248	648	654	805	895	896	1088	1276	1443	1533	1679	1690
rs:													
stria	33	68	67	58	92	98	104	84	142	206	266	255	201
odena	34	13	9	9	24	21	45	46	43	107	227	314	353
ia	78	—	360	342	358	348	361	387	466	500	498	585	512
ents:													
tal	143	—	218	74	94	187	150	156	187	201	187	206	215
ents:													
tal	1158	—	2114	1047	1169	2043	2365	2555	2727	3027	2903	3569	3250

Pernicious anaemia has maintained a steady ratio to the total autopsies and it will be interesting to note if the death rate from this disease is reduced still further in the future as the result of the liver treatment instituted by Minot and Murphy. The percentage of cirrhosis of the liver coming to autopsy has not altered much. While multi-lobular cirrhosis is less common, liver conditions in general have been attracting considerable interest in recent years, and this may explain why the percentage is remaining constant.

Coronary stenosis as a cause of sudden death shows a definite increase and is clearly becoming a commoner one. Clinically sudden death, due to heart failure, may not be increasing. Accuracy in the histological findings of myocardial fibrosis has increased during the last 20 years; nevertheless, the increase during the last 3 years could not be accounted for by this. Acute endocarditis, syphilitic aortitis and valvular disease of the heart have decreased slightly in the same period.

Peritonitis and meningitis show very little change, while tuberculosis is steadily decreasing here from 12 per cent. to 3 per cent.

Cerebral haemorrhage and thrombosis are included under the one heading owing to the difficulty in many cases of deciding whether a haemorrhage had or had not been preceded by a thrombosis. The ratio of these to total autopsies has remained fairly constant. The percentage of accidents has risen slowly over the last 36 years, but reference to Table II shows that the total admissions of accidents during the same period have trebled, whereas deaths from accidents have doubled.

MALIGNANT DISEASE.

The malignant disease column has been expressed as a percentage to (1) total autopsies, (2) total deaths, and (3) total admissions (see Table III). The percentage of malignant disease to autopsies varies from year to year, but steadily increases, and, if the figures are grouped into 5-year periods, the rise becomes more apparent (see Table IV). Meanwhile, the autopsy ratio to the

Table III. *Showing percentage of malignant disease.*

Year	Deaths	Post-mortems	Ma-lignant cases	Admissions	% to post-mortems	% to deaths	% to admissions
1893	500	217	16	5197	7.37	3.20	0.308
1894	540	177	17	5538	9.60	3.15	0.307
1895	579	225	32	5819	14.2	5.53	0.550
1896	599	247	23	5914	9.30	3.84	0.389
1897	645	292	41	6171	14.0	6.35	0.665
1898	680	313	30	6547	9.58	4.42	0.458
1899	720	414	42	6466	10.2	5.84	0.649
1900	691	375	35	6256	9.30	5.07	0.560
1901	717	279	16	6697	5.70	2.23	0.239
1902	771	317	33	6972	10.25	4.28	0.474
1903	765	332	32	7272	9.63	4.18	0.440
1904	754	299	30	7409	10.0	3.98	0.405
1905	841	352	32	7916	9.10	3.80	0.404
1906	953	439	36	7877	8.20	3.78	0.457
1907	843	438	36	8339	8.20	4.27	0.433
1908	895	426	44	8188	10.3	4.92	0.537
1909	894	402	53	8102	13.2	5.95	0.642
1910	862	347	40	8311	11.2	4.50	0.469
1911	917	334	46	8676	13.8	5.10	0.611
1912	893	383	46	7887	12.0	5.10	0.571
1913	931	319	36	9650	11.4	3.60	0.383
1914	996	348	49	10223	14.1	4.90	0.479
1915	1058	381	42	10655	11.0	3.90	0.394
1916	1051	378	49	10735	12.9	4.70	0.456
1917	1037	311	49	10473	15.7	4.70	0.468
1918	1141	332	34	10221	10.2	3.00	0.332
1919	990	352	46	9727	13.1	4.70	0.473
1920	1053	339	53	10455	15.6	5.00	0.507
1921	1005	385	54	10268	14.0	5.40	0.526
1922	921	345	34	10709	9.80	3.70	0.317
1923	942	327	48	12087	14.6	5.10	0.397
1924	1050	351	35	13297	9.90	3.30	0.263
1925	1020	389	60	14187	15.4	6.00	0.423
1926	1038	457	70	14458	15.3	6.70	0.484
1927	1124	484	68	15829	14.0	6.10	0.423
1928	1146	443	60	15799	13.5	5.20	0.380

death rate has been steadily falling as noted previously, yet the percentage of malignant disease autopsies to total deaths has increased. This could be accounted for by the natural desire and greater insistence on a section on any case where malignant disease has been suspected and not located, and also on the many cases where the *post-mortem* alone will reveal the type and total extent of tumour present. So that one cannot conclude that malignant disease, as revealed by autopsy figures, is increasing when the factors cited above are duly considered.

Table IV. *Percentage of lung tumours and cancer of the colon grouped into 5-year periods from 1900-28 inclusive.*

G.R.I. figures		
	Lung tumour	Colon tumour
1900-1904	4.7	8.1
1905-1909	10.6	8.6
1910-1914	7.6	6.8
1915-1919	14.1	10.8
1920-1924	8.3	10.6
1925-1928*	8.0	11.2

Percentage of malignant disease to post-mortems in 5-year periods.

G.R.I. figures	
1893-1898†	11.3
1899-1903	9.0
1904-1908	9.1
1909-1913	12.3
1914-1918	12.8
1919-1923	13.4
1924-1928	13.6

* 1925-1928. This period covers only four years, 1925-1928, the last year of the investigation.
 † 1893-1898. Six years are included in the first period in order to preserve the five-yearly periods up to 1928. More accurate figures are available in the latter years.

Sex and age.

In Table V the age and sex incidence of all the cancer cases has been tabulated for the period 1909 to 1928—a total of 971 cases. Of that number 67 per cent. were males and 33 per cent. were females. During that period, however, the ratio of males and females on whom sections were done, was 64 per cent. to 36 per cent., which is practically the same. From this it follows

Table V. *Analysis of malignant cases into sexes and age periods.*

	G.R.I. figures																		
	Under 20		20-29		30-39		40-49		50-59		60-69		70-79		Over 80		Unknown		
	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	
1909	5	0	1	1	2	2	11	6	7	6	7	1	1	0	0	0	1	2	53
1910	1	0	2	0	0	3	8	2	8	2	9	1	1	1	0	0	1	1	40
1911	0	1	0	1	6	1	3	2	10	2	6	3	0	0	0	0	8	3	46
1912	1	0	0	1	3	0	5	0	6	4	7	4	0	0	0	0	10	5	46
1913	0	0	0	0	1	0	5	1	7	3	10	3	1	0	0	0	4	1	36
1914	2	0	1	1	1	4	6	5	9	3	6	2	2	1	0	0	4	2	49
1915	0	1	3	0	4	2	3	3	5	1	5	2	2	1	0	0	8	2	42
1916	1	3	1	1	5	0	9	1	5	1	10	1	0	0	0	0	8	3	49
1917	1	0	2	0	1	3	5	5	8	3	5	5	2	1	0	0	3	5	49
1918	0	1	0	1	1	5	1	1	4	2	1	2	4	1	0	1	7	2	34
1919	0	0	1	1	1	3	13	5	8	3	7	2	0	0	0	0	2	0	46
1920	0	0	1	2	5	5	5	3	2	5	10	5	2	3	0	0	2	3	53
1921	1	0	1	0	4	0	8	4	15	6	6	2	3	1	0	0	2	1	54
1922	0	0	0	1	1	1	7	1	11	3	2	3	2	0	0	0	0	2	34
1923	2	0	1	1	1	2	4	4	13	2	9	4	1	2	1	0	1	0	48
1924	0	0	2	1	0	2	3	1	4	5	11	2	1	2	0	0	0	0	34
1925	2	1	1	2	5	3	9	3	13	7	9	1	2	0	0	0	1	1	60
1926	0	0	2	0	4	1	10	6	14	7	8	1	6	3	0	0	4	4	70
1927	1	0	6	2	1	2	8	10	10	5	11	4	1	0	0	2	3	2	68
1928	1	0	1	2	3	2	8	4	13	9	7	1	4	2	0	0	2	1	60
Total	18	7	26	18	49	41	131	67	172	79	146	49	35	18	1	3	71	40	971
% in age	2.6		4.5		9.3		20.5		26.0		20.0		5.5		0.41		11.4		—

Causes of Death in Glasgow

Table VI. Showing the frequency of sites involved by cancer.

Year	Mouth	Oesophagus	Stomach	Intestine	Caecum	Colon	Sigmoid	Rectum	Respiratory tract	Lymph-gland	Skin	Pancreas	Liver and gall bladder	Kidney and supra renal	Bladder	Ovary	Testis	Prostate	Brain	Unknown	Breast, uterus
1900	—	2.8	25.0	—	—	5.6	11.2	8.4	8.4	5.6	—	5.6	2.8	5.6	2.8	2.8	—	2.8	8.4	6.2	—
1901	—	6.2	25.0	—	—	6.2	12.4	—	6.2	5.6	—	6.2	6.2	12.4	—	—	—	—	6.2	6.0	6.2
1902	3.0	6.0	24.0	3.0	3.0	9.0	—	12.0	6.0	—	—	9.0	6.0	6.0	—	—	—	—	9.3	3.0	6.4
1903	—	9.3	31.0	—	—	3.1	3.1	3.1	3.1	—	—	12.4	6.2	9.3	—	—	6.6	—	—	—	3.3
1904	3.3	6.6	16.6	—	—	3.3	10.0	3.3	—	3.3	—	10.0	10.0	10.0	3.3	—	—	—	—	—	3.3
1905	6.2	3.1	15.6	3.1	3.1	12.5	9.3	3.3	9.3	6.2	—	10.0	9.3	9.3	3.1	—	—	—	—	—	3.1
1906	5.5	2.7	30.0	2.7	—	5.5	5.5	—	5.5	—	5.5	5.5	5.5	5.5	2.7	—	—	—	11.0	—	—
1907	—	5.5	14.0	—	—	8.3	2.8	—	11.0	5.5	—	2.8	2.8	5.5	—	—	—	—	—	—	8.3
1908	—	2.3	20.0	2.3	2.3	11.2	6.8	6.8	16.0	—	—	2.3	4.6	2.3	—	—	—	—	2.3	—	6.8
1909	1.9	7.5	24.5	—	—	5.6	3.7	3.7	11.2	3.7	1.9	1.9	1.9	2.3	—	—	—	—	7.5	5.6	5.6
1910	2.5	2.5	25.0	5.1	—	5.1	12.8	5.1	2.5	—	10.1	2.5	2.5	5.1	—	1.9	—	—	7.7	5.1	5.1
1911	6.5	6.5	26.0	—	—	4.3	4.3	—	6.5	2.1	6.5	6.5	6.5	—	2.1	4.2	—	—	13.0	2.1	6.5
1912	2.1	6.5	19.5	2.1	2.1	8.7	2.1	2.1	6.5	—	6.5	4.3	8.7	—	2.1	4.2	—	—	10.0	4.2	6.5
1913	11.0	8.3	19.4	2.7	2.7	2.7	—	2.7	16.5	—	—	5.5	8.4	5.5	2.7	—	—	—	5.5	—	—
1914	8.2	2.05	30.5	2.05	—	8.2	—	—	6.1	—	2.05	4.1	6.1	2.1	2.1	—	—	—	10.0	—	12.0
1915	9.5	4.75	2.35	—	—	12.0	—	9.5	14.2	—	2.05	7.1	14.2	7.1	—	—	—	—	—	—	—
1916	6.1	4.1	20.5	—	2.05	12.3	2.05	2.05	12.3	—	2.05	4.1	6.2	8.3	—	—	—	—	8.3	—	2.1
1917	4.1	2.05	22.5	2.05	4.1	6.1	4.1	2.05	16.4	—	2.05	4.1	10.2	—	2.1	4.1	—	—	6.1	4.1	4.1
1918	10.0	3.3	13.4	—	—	3.3	10.0	6.6	16.8	—	3.3	—	13.4	—	3.3	3.3	—	—	6.6	6.6	10.0
1919	4.3	6.5	19.6	—	—	19.6	—	4.3	10.9	—	2.2	2.2	8.8	6.5	2.2	—	—	—	4.3	—	2.2
1920	—	3.7	24.5	3.7	5.6	9.4	9.4	3.7	9.4	—	3.7	3.7	3.7	—	3.7	—	—	—	9.4	—	7.5
1921	5.5	3.7	29.5	1.85	3.7	9.3	1.8	3.7	7.4	1.8	—	5.5	7.4	1.8	3.7	—	—	—	7.4	1.8	1.8
1922	—	5.9	29.5	2.9	4.15	14.8	2.9	2.9	8.7	2.9	—	5.9	2.9	8.7	2.9	—	—	—	—	—	2.9
1923	—	6.2	14.5	—	—	8.3	8.3	10.4	10.4	2.1	—	6.2	6.2	2.1	2.1	—	—	—	—	—	2.9
1924	2.8	2.8	20.0	—	2.8	11.4	11.4	2.8	5.7	—	—	—	5.7	2.8	—	—	—	—	8.3	2.1	—
1925	5.0	1.42	16.4	1.42	3.3	15.0	3.3	3.3	10.0	3.3	—	5.0	1.4	3.5	1.4	—	—	—	5.7	2.8	11.0
1926	4.25	4.25	18.4	2.85	5.7	8.5	2.85	1.4	10.0	1.4	5.7	7.1	1.4	1.4	1.4	—	—	—	6.6	1.4	5.0
1927	—	2.8	23.5	4.4	—	13.0	—	1.4	14.6	4.4	2.8	2.8	8.8	—	2.8	—	—	—	7.3	2.8	2.8
1928	1.67	3.3	25.0	3.3	—	8.3	1.67	3.3	5.0	—	3.3	6.6	3.3	—	5.0	—	—	—	1.7	—	13.0

that there is little difference between the sexes as regards malignant disease, remembering, of course, that breast and uterine cancers rarely come to autopsy in a general hospital. The age period showing the highest percentage of malignancy is 50-59, but there is little difference between 40-49, 50-59 and 60-69. It is regrettable that in 11 per cent. of the cases, the age was unknown.

Site.

Table VI gives a list of the commoner sites where malignancy occurs and the percentage in which it is involved annually. Breast and uterus are combined for they seldom come to autopsy in our hospital for the reason noted earlier, but are included here for completeness.

Comment. There being only a very small increase in the percentage of cancer cases, naturally one cannot look for a spectacular increase in one site over another. There appears to be a slight rise in the colon group. The prostate group seems also to show a rise, but this may be due to the frequency of unknown sites corresponding with the years when there was a smaller number of malignant prostates. The interesting group is the intra-thoracic one labelled "respiratory tract." This group shows no increase whatever. This is not in accordance with the findings in other hospitals, with the notable exception of Leeds Hospital whose statistics for lung tumour were published recently by Bonser (1929). She shows that there is no increase in intra-thoracic tumours

Table VII. *Malignant disease of the respiratory system.*

Year	Post-mortems	Total malignant cases	Cancer of thorax	% total cancer	% post-mortems
1909	402	53	6	11.3	1.5
1910	347	40	2	5.0	0.58
1911	334	46	4	8.7	1.2
1912	383	46	3	6.5	0.78
1913	319	36	6	16.5	1.9
1914	348	49	3	6.1	0.86
1915	381	42	6	14.3	1.6
1916	378	49	6	12.5	1.6
1917	311	49	9	18.4	2.9
1918	332	34	5	14.7	1.5
1919	352	46	5	10.9	1.4
1920	339	53	5	9.6	1.4
1921	385	54	4	7.4	1.0
1922	345	34	3	8.8	0.8
1923	327	48	5	10.5	1.5
1924	351	35	2	5.7	0.2
1925	389	60	6	10.0	1.5
1926	457	70	7	10.0	1.5
1927	484	68	10	15.0	2.1
1928	443	60	3	5.0	0.68

over the period 1891 to 1927. Bonser's figures and ours are similar in the percentage of intra-thoracic cancer to total cancer (see Table VII) and both are higher than the Continental figures over the same period (Bonser, 1929). The ratio of cancer of the lung to total autopsies also bears a remarkable similarity and shows no increase. The age incidence has a maximum between 40-49, but

Causes of Death in Glasgow

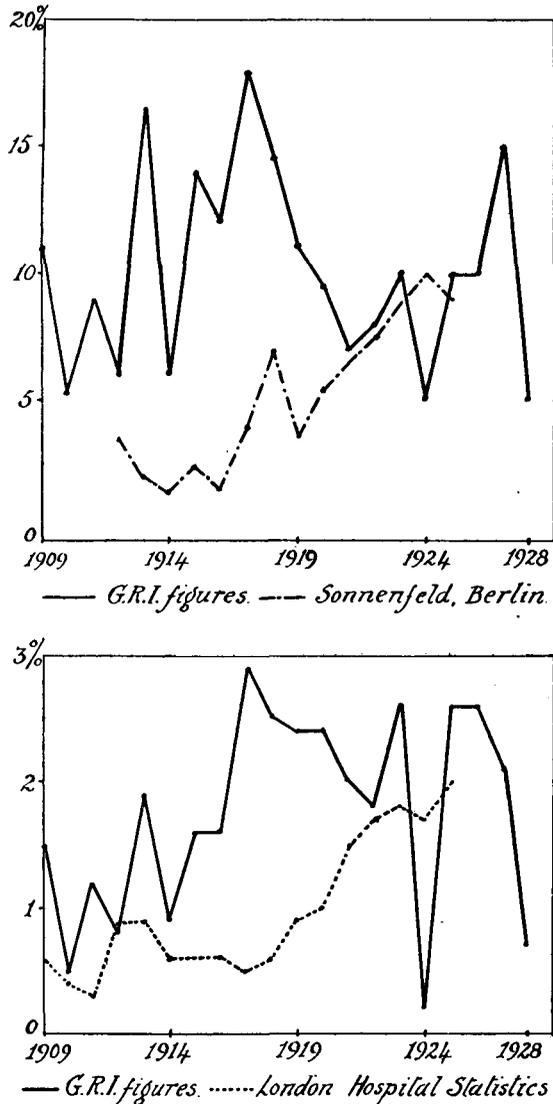
again, little difference between 30-39, 40-49, 50-59. The average age, however, appears to be about 10 years younger than the average age in which malignancy is common. The sexes are involved in the usual percentage quoted by Bonser (1929), Duguid (1927) and others, 71 per cent. males to 29 per cent. females (see Table VIII).

Table VIII. *Cancer of lung*—100 cases.

	1-19		20-29		30-39		40-49		50-59		60-69		70-79		Over 80		Unknown	Total
	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	T.		
1909	1	—	—	—	1	—	—	—	2	2	—	—	—	—	—	—	—	6
1910	—	—	—	—	—	1	1	—	—	—	—	—	—	—	—	—	—	2
1911	—	—	—	1	1	—	—	—	—	—	1	—	—	—	—	—	1	4
1912	—	—	—	—	—	—	2	—	—	—	—	1	—	—	—	—	—	3
1913	—	—	—	—	1	—	2	—	2	—	1	—	—	—	—	—	—	6
1914	—	—	—	—	1	—	1	1	1	—	—	—	—	—	—	—	—	3
1915	—	—	—	—	2	—	1	1	—	—	1	—	—	—	—	—	1	6
1916	—	—	1	—	—	—	3	—	—	—	—	—	—	—	—	2	—	6
1917	—	—	2	—	—	—	2	2	1	—	—	1	—	—	—	—	1	9
1918	—	—	—	—	—	1	—	—	—	—	—	1	—	—	—	2	1	5
1919	—	—	—	1	—	1	1	—	2	—	—	—	—	—	—	—	—	5
1920	—	—	—	1	—	1	—	1	1	—	—	1	—	—	—	—	—	5
1921	—	—	—	—	1	—	—	—	1	—	1	1	—	—	—	—	—	4
1922	—	—	—	—	—	—	1	1	—	—	—	—	1	—	—	—	—	3
1923	2	—	—	—	—	1	—	—	—	—	2	—	—	—	—	—	—	5
1924	—	—	—	1	—	—	—	—	—	—	1	—	—	—	—	—	—	2
1925	—	—	1	—	2	—	—	—	2	—	1	—	—	—	—	—	—	6
1926	—	—	—	—	—	—	2	1	4	—	—	—	—	—	—	—	—	7
1927	—	—	1	—	2	3	—	—	1	—	2	—	—	—	—	1	—	10
1928	—	—	—	—	—	—	1	—	1	—	1	—	—	—	—	—	—	3
Total in age Periods	3 —		5 4		10 9		16 7		17 3		11 4		2 —		— 1		7 1	
	3		9		19		23		20		15		2		1		8	
	Total males, 71.										Total females, 29.							

Table IV records 5-year periods of malignant disease in the two sites that attract particular attention. There is a steady rise in the percentage of tumours of the colon, but no similar rise is evident in lung tumours. Graph 1 shows tumours of the lung as a percentage to total cancer and total autopsies to compare with the figures from other institutions for which references are given. In the figures by Sonnenfeld (1926), for Berlin, the percentage of lung tumours in 1912 was much below ours and only in recent years has it approached the level here. From the figures given it would appear that malignant disease of the lung was increasing rapidly there but they do not control their figures by giving the total number of autopsies performed annually. With regard to the London Hospital statistics (Simpson, 1927) the same criticism could be offered that I put up against my own. The ratio between autopsies and death is falling and, therefore, a more selective action is being exercised in trying to obtain sections on rare or obscure cases of lung conditions, particularly when an autopsy is necessary to formulate a diagnosis. The statistics of the Leeds General Hospital are far more valuable in that there the percentage of *post-mortems* to deaths has remained constant over a large number of years, usually about 90 per cent. of the deaths being autopsied.

I investigated the histories of the cases of cancer of the lung coming to autopsies, particularly with regard to their occupation, when stated, and the duration of their complaint from the first appearance of symptoms attributable



Graph 1. Upper section shows cancer of lung to total cancer percentage. Lower section shows cancer of lung to total percentage of autopsies.

to the condition. All trades were represented and a larger number was drawn from miners, engineers, blacksmiths, iron and steel workers and labourers than from indoor sedentary workers. Considering that these represent the main occupations of Glasgow's population, I do not think any deduction could

be usefully drawn. All these types of occupations have one feature in common. The workers are employed in an atmosphere which is laden with dust, but the type of dust varies in the different trades. I cannot conceive that there could be any specific irritant in the dust but that it might be due to the irritation of foreign bodies in the respiratory tract. I did not find any preponderance of tar workers, transport workers or stable workers in the records, contrary to beliefs published elsewhere (Staehelin 1925; Duguid 1927; Hudson 1926).

Regarding female cases, a large number were housewives, but how long they had been so, and whether they had previously followed a definite occupation, was not stated, and made the investigation worthless from that point of view.

The duration of the complaint from the first appearance of any referable symptom to death varied between 2 months and 2 years, but the average in the 114 cases in which it was stated worked out at slightly over 6 months.

CONCLUSIONS.

The conclusions to be drawn from this paper are (1) that statistics compiled from autopsy records alone proving that malignant disease is increasing are fallacious, unless they are properly controlled, and our statistics fail to demonstrate any spectacular increase in malignant disease as a cause of death, (2) that from the records of autopsies in the Royal Infirmary in Glasgow there is no evidence that malignant disease of the lung is increasing, but that the numbers are too small to justify any positive statements, (3) that as far as our figures show, malignant disease of the colon has increased more than that of any other site.

I am indebted to Prof. Passey at whose suggestion this investigation was undertaken and to Prof. Teacher for his useful suggestions and helpful criticism.

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