FIG. 4.—Frontispiece of H. S. Ward's (1896) *Practical Radiography*. (Kindly supplied by the Chester Beatty Research Institute Library)

chose to call it, "stimulated the uneducated imagination" to a similar extent.

The librarians of the British Museum, the Brompton Hospital, the Nuffield Library, *Nature*, the British Association, the North Staffordshire Medical Institute, the Chester Beatty Research Institute, and the Oesterreichische Nationalbibliothek very kindly provided me with much of the basic material for this paper. I also thank Miss R. J. Posner, Dr. L. A. Bowcock, and Mrs. M. Hampton for their help. Drs. Cameron and Hill, of Messrs. Pilkington, kindly enlightened me with regard to the radio-opacity of commercial glass.

REFERENCES

- British Medical Journal*, 1896a, 1, 238.
British Medical Journal, 1896b, 1, 289.
British Medical Journal, 1896c, 1, 361.
British Medical Journal, 1896d, 1, 532.
Electrical World, 1896, 27, 339.
Electrician, 1896a, 36, 353.
Electrician, 1896b, 36, 448.
Frankfurter Zeitung, 1896, 7 January.
Friedrich, W., Knipping, P., and Laue, M. (1912). *Sitzungsberichte der mathematisch-physikalischen Klasse der Königlich Bayerischen Akademie der Wissenschaften zu München*, p. 302.
Frost, E. B. (1896). *Science*, 3, 235.
Glasser, O. (1933). *Wilhelm Conrad Röntgen and the Early History of the Roentgen Rays*. London, John Bale, Sons and Danielson.
Glasser, O. (1937). *Scientific Monthly*, 45, 193.
Holland, C. T. (1937). *Liverpool Medico-Chirurgical Journal*, 45, 61.
Hunter, B. (1896). *Electrical Engineer (New York)*, 22, 534.
Journal of the American Medical Association, 1896, 26, 336.
Jones, R., and Lodge, O. (1896). *Lancet*, 1, 476.
Lancet, 1896a, 1, 112.
Lancet, 1896b, 1, 179.
Lancet, 1896c, 1, 205.
Lancet, 1896d, 1, 245.
Lenard, P. (1894). *Annalen der Physik und Chemie*, 51, 225.
Lister, J. (1896). *Report of the Sixty-Sixth Meeting of the British Association for the Advancement of Science*. London, Murray.
Medical Protection Society (1970). *Annual Report*, p. 21.
Nature, 1896, 53, 253.
Plücker, J. (1858). *Annalen der Physik und Chemie*, 103, 88.
Röntgen, C. W. (1895). *Sitzungsberichte der Physikal-Medizin Gesellschaft in Würzburg*, 29, 132.
Röntgen, C. W. (1896). *Sitzungsberichte der Physikal-Medizin Gesellschaft in Würzburg*, 30, 11.
Sarton, G. (1937). *Isis*, 26, 349.
Schuster, A. (1896). *British Medical Journal*, 1, 172.
Schuster, N. H. (1962). *British Medical Journal*, 2, 1164.
Shanks, C. C. (1950). In *50 Years of Medicine*, p. 211. London, British Medical Association.
Swinton, A. A. C. (1896). *Nature*, 53, 276.
Underwood, E. A. (1945). *Proceedings of the Royal Society of Medicine*, 38, 697.
Ward, H. S. (1896). *Practical Radiography*. With chapters by E. A. Robins and A. E. Livermore. London, Dawbarn and Ward.
Watson, F. (1934). *The Life of Sir Robert Jones*, p. 87. London, Hodder and Stoughton.

MEDICAL EDUCATION

Origin and Employment of the Medical Graduates of the University of Aberdeen 1931-69

D. OGSTON,* M.D., M.R.C.P. ; W. D. OGSTON,† M.B. ; C. M. OGSTON,‡ M.B.

British Medical Journal, 1970, 4, 360-361

Summary: A survey was made of the medical graduates of the University of Aberdeen, 1931-69. The recent increase of graduates of non-British origin, the continuing high intake of women and their subsequent attrition, and the high rate of emigration, have combined to reduce substantially the number of these graduates working in Britain.

Introduction

There is little published information on the medical graduates of individual universities, apart from a series of papers by Whitfield (1962, 1964, 1969b) describing the medical graduates of the University of Birmingham. We report the findings of a survey of the origin and employment of the medical graduates of the University of Aberdeen of 1931 to 1969.

* Senior Lecturer in Medicine, University of Aberdeen.
† Senior Lecturer in Mental Health, University of Aberdeen.
‡ Housewife, Aberdeen.

Present Survey

Sources of Information

The names and normal residences of the graduates were obtained from Aberdeen *University Calendars* of 1931-69. The type and place of subsequent medical employment were traced from the past and current *British Medical Directory*, *Canadian Medical Directory*, the *Medical Register*, the Aberdeen *University Roll of Graduates*, 1925-55, and the Aberdeen *University Review*.

Findings

Proportion of Men and Women Graduates.—Out of the 2,766 graduates of the whole period 1931-69, 659 (23.8%) were women. The proportion of women graduates increased from 7.8% in 1931-5 to 29.3% in 1946-50. Since then the proportion has remained relatively constant. During 1951-65 26.0% of the graduates were women; the proportion of women graduates of the academic years 1960-7 (27.1%) is similar to that

(24.7%) from all British medical schools over the same period (Royal Commission on Medical Education, 1968).

Source of Graduates.—The University of Aberdeen has traditionally drawn most of its undergraduates from the north-east of Scotland (Table I). This proportion has fallen since the late 1950s, while there has been a striking rise in

TABLE I.—Normal Residence of Graduates 1931-69

Period	Total No. of Graduates	Percentage from Each Region			
		North-east Scotland	Rest of Scotland	England/Wales	Overseas
1931-5	244	79.2	5.7	6.1	9.0
1936-40	440	81.5	8.9	5.5	4.1
1941-5	390	80.1	7.4	7.9	4.6
1946-50	389	75.9	10.0	11.5	2.6
1951-5	370	75.4	13.0	8.1	3.5
1956-60	325	66.5	9.8	16.6	7.1
1961-5	304	53.7	8.2	12.8	25.3
1966-9	304	59.9	10.5	15.1	14.5
1931-69	2,766	72.2	9.3	10.3	8.2

graduates whose home residence was abroad; this reached a peak in the early 1960s. Throughout the period covered by this survey there has been a steady intake of students from the West Indies; in recent years students from the developing African countries and from Norway have contributed most to the increase in overseas graduates.

Employment of Graduates.—Graduates of the period 1961-9 have not been included in this analysis since many will not yet have settled in their permanent sphere of work. Apart from those who died within 10 years of qualification all male graduates of 1931-60 have been classified according to their current employment or their employment at the time of death or retirement in Great Britain (Table II). While the proportion who have settled in general practice has remained

TABLE II.—Employment of Male Graduates of 1931-1960

Employment	Period						
	1931-5	36-40	41-5	46-50	51-5	56-60	31-60
	Percentage in Each Type of Medical Work						
General practice ..	41.3	43.9	44.5	40.0	42.9	40.3	42.3
Hospital appointments ..	20.9	22.4	23.5	18.1	16.9	16.9	20.0
Academic and research appointments ..	3.6	3.9	3.6	4.0	3.5	5.5	4.0
Public health ..	4.0	4.4	3.9	3.6	3.5	0.4	3.4
Administration ..	3.1	2.2	1.1	1.5	0.4	0	1.4
Armed Forces medical services ..	4.0	3.6	1.4	2.9	3.1	5.5	3.4
Industrial medicine ..	0.9	0.3	0	1.5	1.4	0	0.7
Pharmaceutical industry ..	0	0	0	0.7	0.7	0.8	0.4
Colonial Medical Service ..	0.9	0	0	0	0	0	0.1
Working overseas (British origin) ..	4.0	8.6	12.4	19.9	22.0	20.8	14.5
Working overseas (non-British origin) ..	8.9	3.9	4.6	2.9	2.4	5.5	4.5
Died within 10 years of qualification ..	4.9	3.0	1.8	1.5	1.0	1.3	2.2
Untraced or inadequate information ..	3.1	2.0	2.9	2.5	2.1	1.7	2.3
Others* ..	0.4	1.7	0.8	0.7	0.4	1.2	0.8
Total ..	225	362	281	275	287	236	1,666

*H.M. Prison Service, Student Health Service, W.H.O., etc.

relatively constant the proportion taking up hospital appointments has declined. Over the period 1931-60 surgery (18.8%), psychiatry (15.1%), medicine (13.6%), anaesthetics (10.3%), pathology (7.8%), and obstetrics (7.0%) have attracted most graduates entering academic and hospital posts: there has been no clear-cut trend in the choice of speciality.

Emigration.—This survey indicates that about a fifth of the male Aberdeen graduates of each five-year period from 1946-50 to 1956-60 are working overseas at present. Most of these are emigrants. This level agrees with estimates of emigration rates during this period for graduates of all British medical schools (Abel-Smith and Gales, 1964; Seale, 1964). Against the loss of 242 male graduates of the period 1931-60 must be set the 29 graduates of non-British origin who have remained to practise in Britain. As found in previous surveys of medical emigration from Britain (Seale, 1966; Ash and Mitchell, 1968; Whitfield, 1969a), Canada (101) and Australia (62) were the most frequently chosen countries over the whole period and also for graduates of each of the five-year periods from 1936 to 1960.

Comment

The return of graduates of non-British origin overseas, the temporary or permanent loss of women graduates from medical work (Lawrie, Newhouse, and Elliott, 1966; Flynn and Gardner, 1969; Timbury and Ratzer, 1969), and the high rate of medical emigration combine to produce a substantial loss of medical manpower to Britain. At a time of both a present and a projected future shortage of doctors in Britain (Royal Commission for Medical Education, 1968) there is an urgent need to prevent such high losses. While increasing the medical student intake will help to offset these losses, a more rational approach would be to minimize the sources of the current losses. Logical measures would include reducing the intake of students of non-British origin and, where suitable male applicants are available, women students. Wastage of women medical graduates might also be reduced by establishing more part-time posts and by instituting taxation provisions which would offer an incentive to married women doctors to return to work. Finally, there is a continuing need for improvement in the conditions within the National Health Service to encourage medical graduates to remain in Britain to practise.

REFERENCES

- Abel-Smith, B., and Gales, K. (1964). *British Doctors at Home and Abroad*, Welwyn, Codicote Press.
 Ash, R., and Mitchell, H. D. (1968). *British Medical Journal*, 1, 569.
 Flynn, C. A., and Gardner, F. (1969). *British Journal of Medical Education*, 3, 28.
 Lawrie, J. E., Newhouse, M. L., and Elliott, P. M. (1966). *British Medical Journal*, 1, 409.
 Royal Commission on Medical Education (1968). *Report, 1965-68*, Cmnd. 3569. London, H.M.S.O.
 Seale, J. (1964). *British Medical Journal*, 1, 1173.
 Seale, J. (1966). *British Medical Journal*, 2, 576.
 Timbury, M. C., and Ratzer, M. A. (1969). *British Medical Journal*, 2, 372.
 Whitfield, A. G. W. (1962). *Lancet*, 1, 99.
 Whitfield, A. G. W. (1964). *Lancet*, 1, 374.
 Whitfield, A. G. W. (1969a). *Lancet*, 1, 667.
 Whitfield, A. G. W. (1969b). *Lancet*, 1, 882.