currence of malignant disease. Our result gives some idea of the encouragements and disappointments that one might expect from a policy when further laparotomy is offered to all but those with obvious hopeless disseminated disease.

Three patients were found to have non-malignant conditions with no evidence of recurrence of the original disease; there was one example of obstruction due to adhesions, one a granulomatous stricture at the anastomosis, and one a twisted ovarian cyst. The first two patients remained alive and well but the third died three years later of congestive cardiac failure. Two patients had developed entirely new tumours presenting as abdominal masses. One of these had a carcinoma of the body of the uterus who a year after hysterectomy developed recurrences in the vault of the vagina and died; the other had a renal carcinoma and died a few months after nephrectomy from widespread metastases.

Four patients developed metachronous tumours in another part of the large bowel which were suitable for resection. One died of recurrences 18 months later. The other three were alive and well four years, three years, and two months after resection. Eight patients developed a recurrence at or near the anastomosis which was resected. Three of these died within the year and a fourth at 15 months. One patient was lost sight of and at the time of writing one was still immediately post-operative. Two were living at 18 months and four years after resection, free from apparent recurrence.

Two patients with recurrences at the anastomosis with intestinal obstruction could only be short-circuited and both died within three months of operation. Five patients had excisions of recurrences in the abdominal scar, the perineum, ovary, or pelvis. Four died at 3, 10, 13, and 15 months of metastatic disease, but the patient with a perineal metastasis after abdominoperineal excision of the rectum was free of disease over two years later.

Three patients were found to have disseminated deposits at second laparotomy, and these were treated with either radiotherapy or cytotoxic therapy or a combination of the two. One was alive and well eight months later, one died at three months, and one died at one year.

To sum up this small series of 27 patients submitted to re-exploration, nine achieved long-term good results and two remained well within a year of their second operation.

Conclusion

We feel that there is much to gain and little to lose in offering laparotomy to patients with apparent recurrence of large-bowel cancer. The occasional case with benign disease alone is worth all the endeavour, and certainly the occasional long-term survival of patients with resection of recurrence at the anastomosis or a second tumour elsewhere in the bowel is encouraging. Even in those cases where long-term survival has not been achieved it has often been possible to remove or short-circuit painful obstructive lesions. Even if at exploration a surgically hopeless situation is found, laparotomy delimits the extent of the problem, allows consideration of further treatment in the way of radiotherapy or cytotoxic therapy, gives some idea of prognosis, and, at the very least, gives the patient and his family the knowledge that no effort has been spared before giving the final, hopeless prognosis.

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Contemporary Themes

Anaesthetic Staffing and Training Requirements in Scotland

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British Medical Journal, 1971, **3**, 293-296

Summary

In Scotland there is an average of 12 consultant vacancies and 14 Fellows qualifying per year, but these are insufficient to meet all the vacancies as several emigrate

or return abroad. The existing registrar and senior registrar establishments are inadequate to meet the numbers of consultants required if full allowance is made for special factors, such as the high proportion of women graduates and the rising proportion of overseas trainees.

A backlog of understaffing in Scotland relative to England and Wales is shown by comparison of the ratio of anaesthetists to surgeons. The existing rate of expansion of 6% per year must continue for many years or be increased if staffing levels are to come into line with those elsewhere in Britain.

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It is recommended that there should be at least one junior anaesthetist for every two junior surgeons and efficient training programmes must be fostered during the present national shortage of senior anaesthetists.

Introduction

Available data have been reviewed to assess whether the rate at which anaesthetists are being trained is adequate for present and future requirements. Staffing tables published annually by the Scottish Home and Health Department¹⁻³ have indicated Scottish consultant anaesthetist vacancies of five or six a year. The total number of junior staff in anaesthetics has been about 130, and with a recommended six-year duration of training a maximum output of 21 consultants a year should theoretically be possible. Nevertheless, serious anaesthetic shortages have arisen and the figures warrant closer scrutiny.

TABLE I—Anaesthetic Consultant Vacancies arising in Scotland

	1964	1965	1966	1967	1968	1969	1970	Average
Estimated No. of appointments to be filled*	—	—	—	5	5-6	6	—	5.5
Gross No. of appointments advertised†	28	21	16	15	9	17	15	18
Corrected No. of appointments advertised‡	19 (9)	12 (9)	10 (6)	13 (2)	7 (2)	11 (6)	14 (1)	12 (6)
New appointments created*	12	16	11	4	9	4	6	9

*From published staffing statistics.

†From *British Medical Journal*.

‡After allowing for readvertisement of unfilled appointments (number of readvertisements indicated in parentheses).

"Limited Specialists" are not included in the table.

Number of Consultant Vacancies arising Each Year

Analysis of the published data indicates an average of nine new consultant anaesthetist appointments a year over the past seven years (see Table I) and also shows a retirement rate of about one a year. There are thus about 10 appointments a year, excluding those caused by emigration, premature death, illness, or miscellaneous other causes. A study of the advertisements in the *British Medical Journal* suggests that about two extra consultant vacancies occur from such causes, to give a total of 12 a year, or double the official estimates of 1967-9. The discrepancy between the gross number of appointments advertised and the numbers corrected for readvertisement is shown in Table I. This discrepancy is in part caused by failure to train an adequate supply of consultant anaesthetists.

Number of Anaesthetists being Trained

The results of the F.F.A. R.C.S. examinations provide an accurate index of the numbers of anaesthetists being trained. Results of the past six years indicate an average of over 14 Fellows a year from Scottish hospitals (Table II). Occasional anaesthetists from Scotland take the Irish Fellowship, and six Fellows, including three from overseas, qualified in Dublin during the period of this study.

Balance

To complete the balance sheet one must take into account the movement of anaesthetists to and from Scotland, and in particular the departure of anaesthetists overseas. The latter can be divided into two categories: return abroad of overseas graduates and emigration of Scots graduates. The figures

TABLE II—Anaesthetists in Training—Fellowship Results

	1964	1965	1966	1967	1968	1969	1970	Average
Primary F.F.A. R.C.S.*	N.A.	N.A.	N.A.	14	16	13	N.A.	14
Final F.F.A. R.C.S., Scottish graduates*	17	13	10	10	14	16	9	12.7
Final F.F.A. R.C.S., overseas graduates*	N.A.	N.A.	N.A.	2	3	1	1	2

*Candidates with address in Scotland at time of passing the examination.
N.A. = Not available.

for 1968 and 1969³ showed that 16% of registrar anaesthetists were born overseas, but in 1970 the proportion had risen to 27%. Though we are fortunate in being able to retain some overseas graduates to solve our constant shortage most return abroad. Moreover, emigration of Scots anaesthetists occurs and follows a long tradition of emigration of Scottish doctors. After study of the present addresses in the *Medical Directory* of the 49 Scottish Fellows who qualified in 1964-7 it appeared that 7 (14%) were overseas. With the world-wide shortage of anaesthetists and the high international esteem for the Fellowship of the Faculty of Anaesthetists probably emigration must be accepted as a permanent factor. As 25% of the Fellows qualifying in the past six years were women this is an additional factor of importance, since we lose some of these owing to marriage and family commitments.

After making allowance for these factors we find that about two-thirds of the qualifying Fellows—or about nine consultants a year—are available to take posts in Scotland. This is inadequate for our needs and leads in consequence to the large number of readvertised vacancies mentioned above (Table I) and a tendency to appoint anaesthetists lacking the Fellowship to consultant rank.

In this assessment the small movement of anaesthetists to and from England must also be mentioned, but ideally one would hope the overall balance would be maintained in the long run.

Future Trends of Training

It is important to assess whether the shortage of anaesthetists can be corrected by applying improved training techniques to the present establishments of anaesthetic junior staff. The maximum number of consultants which can be trained is limited by the number of junior staff and the recommended duration of training. It is wisest to exclude senior house officers from such a calculation, as this grade includes many who do not intend a permanent career in anaesthetics. These posts are useful for general practitioners who may need to cover dental or other anaesthetic sessions, for doctors training for other hospital specialties with intensive care or resuscitation responsibilities, and for overseas doctors from countries lacking adequate anaesthetic services.

To assess the maximum number of anaesthetists who can be trained one must consider the registrar and senior registrar grades (Table III). It is essential to separate the women graduates

TABLE III—Number of Registrars and Senior Registrars in 1970*

	Registrar	Senior Registrar	Total
Men graduates	53	16	69
Women graduates	31	6	37

*Figures from Scottish Home and Health Department.

in such calculations, as a high proportion will leave because of marriage and family responsibilities. Some evidence of such a loss is provided by a discrepancy between the proportion of female registrars (37%) and the proportion of women in

the Fellowship pass results (26%), but the most relevant study on this aspect is that by Timbury and Ratzer,⁴ who found that only 31% of Glasgow women medical graduates were working full time after 15 years. Slightly higher percentages were found in a British study by Last and Broadie⁵ and in Birmingham by Whitfield,⁶ but these were over a shorter period, and in the long term it seems reasonable to estimate that only a third of women graduates are likely to complete the post-graduate training.

In 1970 the number of anaesthetists in long-term training in Scotland was thus 81—69 men and 12 women. With a minimum of five years of training in these grades (excluding the year as a senior house officer) the maximum output of trained anaesthetists a year is 16, but this maximum can never be achieved as there will be in-training losses from registrars emigrating, returning overseas, or going into general practice. Consequently the average output of over 14 "F.F.A.s" a year reflects an efficient training system. Any increase of the number of trained anaesthetists is dependent on increases in registrar and senior registrar establishments.

Future Trends of Consultant Appointments in Scotland

The expansion of the specialty in Scotland is at present running at 6% per annum (Fig. 1), while that in England and Wales is at about 3% per annum (Fig. 2). The explanation lies in a shortage of senior anaesthetists in Scotland relative to England, which is being corrected by a higher growth rate.

Comparison of the level of anaesthetic staffing in Scotland and in England and Wales is not easy, but an estimate of the size of the relative shortage in Scotland can be obtained by comparison of the ratio of the number of anaesthetists to the number of surgeons served. Because the anaesthetist's time is largely devoted to surgical theatre work and associated preoperative and postoperative care, this ratio is a more valid calculation to assess the overall adequacy of staffing than comparisons such as hospital beds or population served.

As figures relating consultant staff to population served have been used in the Godber report⁷ it is of interest that in the U.S.A. double the number of surgeons (per head of population) do double the number of operations.⁸ Use of a ratio relating anaesthetists to population figures can therefore be particularly misleading. The anaesthetist/surgeon ratios based on 1970 statistics tables are given in Table IV.

FIG. 1—Rate of increase in number of consultant anaesthetists in Scotland, 1950-70.

FIG. 2—Rate of increase in number of consultant anaesthetists in England and Wales, 1950-70.

TABLE IV—Consultant Anaesthetist/Consultant Surgeon Ratios

	Scotland	England and Wales
Consultant anaesthetists	161	1,232
Consultant surgeons*	339	2,083
Anaesthetist/surgeon ratio	1:2.11	1:1.69

*Including general, neural, plastic, thoracic, paediatric, and orthopaedic surgery, E.N.T. and urology (based on 1970 staffing statistics).

From the data in Table IV it is possible to calculate the current shortage of consultant anaesthetists in Scotland by using an anaesthetist/surgeon ratio of 1:1.69. An extra 40—that is, 201 in place of 161—were required in 1970 to raise the standard to that in the rest of Britain. If one uses as a yardstick the ratio of anaesthetists to surgeons and obstetricians-gynaecologists then an even greater shortage of Scottish anaesthetists is indicated.

If the present rates of expansion in Scotland and England continue it will take about 14 years to bridge a staffing gap of 40 anaesthetists. The average level of staffing in England and Wales, however, which has been used as a standard, includes many areas which are relatively understaffed, and the overall rate there has also been restricted by a lack of adequate numbers of trained anaesthetists. Consequently the period of time over which present rates of expansion will continue is likely to be much greater, and any subsequent reduction of the rate of expansion of new appointments will be compensated for by the steady increase in the numbers of appointment vacancies arising from retirement (Table V).

TABLE V—Vacancies arising from Retirement

	1968/72	1973/77	1978/82	1983/88	1988/92
Vacancies from retirement* ..	5	16	24	23	37
Approximate rate per year ..	1	3	5	5	7

*Based on age records.

The calculations given in Table V are based purely on the comparison of Scotland with the rest of Britain and do not allow for an accelerated expansion of anaesthetics in Britain to cope with increasing standards in the intensive care, resuscitation, and recovery ward areas or to meet an expansion of consultant surgical staffing. Estimates of the adequacy of anaesthetic staffing may also be obtained by comparing anaesthetist to operation ratios. Unfortunately operation statistics in Scotland are categorized differently from those in England and Wales, and in addition are based on a sampling technique in the latter case. Consequently operation data are less suitable than surgical staffing ratios when comparing anaesthetic staffing in the countries concerned.

Synchronization of Junior Appointments

In view of the current imbalance in the numbers of senior

TABLE VI—Junior Anaesthetist/Junior Surgeon Ratios

	Scotland	England and Wales
Junior anaesthetists (senior registrar and registrar)	106	790
Junior surgeons* (senior registrar and registrar)	295	1,726
Ratio junior anaesthetists/surgeons ..	1:2.78	1:2.18
Consultant ratio	1:2.11	1:1.69

*Including general, neural, plastic, thoracic, paediatric, and orthopaedic surgery, E.N.T. and urology (1970 figures).

Scottish anaesthetists to surgeons it could be expected that the proportion of surgeons to anaesthetists in training had been reduced to allow the staff ratios to correct themselves; this is far from the case (Table VI).

The ratios of junior surgeons to anaesthetists are higher than the consultant ratios and are even higher in Scotland than in England. This lack of balance gives reason for grave concern for the future careers of the excess of junior surgeons who are being trained to work without the concomitant training of the essential anaesthetic staff to back them up.

Use of Subconsultant Grade

As a possible solution to anaesthetic shortages one could consider the increased use of "medical assistants," with a period of training cut to about three years, to allow more "anaesthetists" to be trained. The use of such grades has strong opposition from the profession as it is too obvious that they could be abused, as was the previous senior hospital medical officer grade, with the appointees finding themselves performing unsupervised consultant work without consultant pay. A further problem to such grades is that as they require consultant supervision they may occupy positions which could otherwise be used for much-needed training appointments.

In the U.S.A. and Sweden the problem of anaesthetist shortages has been solved by the use of "nurse anaesthetists" in some areas. As with the use of medical assistants this solution also has strong opposition from the profession, and it appears more expedient than desirable in those countries in which it has occurred. The use of nurse anaesthetists is not likely to be a solution to anaesthetic staffing problems in Scotland, as nurses are in very short supply; in addition, to deploy a supervised team of nurse anaesthetists efficiently necessitates large modern operating-theatre suites, which we lack.

Though nurse anaesthetists administering anaesthetics do not provide a solution to our shortages "anaesthetic nurses" trained to help in the anaesthetic room, theatre, and recovery area have a valued place, and it is regrettable that the current nursing shortage is restricting expansion in this field.

Recommendations

An increase of anaesthetic junior staffing is urgently needed, as without this we can never hope to achieve the increased number of anaesthetists needed. The size of the increase is dictated to some extent by the number of surgeons in training. When the numbers of surgeons in training are correctly balanced to the number of surgical consultant vacancies there should be at least one anaesthetist in training for every two surgeons. While awaiting the necessary increases in anaesthetic staffing, both senior and junior, existing training appointments must be efficiently used and recommended day release or study leave provided.⁹⁻¹⁰ There are several excellent reports giving guidance in the application of anaesthetic training schemes and concurrent maintenance of the best service for the patients.¹¹⁻¹⁴

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Therapeutic Conferences

Atrial Fibrillation—II

FROM THE DEPARTMENT OF THERAPEUTICS AND PHARMACOLOGY, ABERDEEN UNIVERSITY

PROFESSOR MACGREGOR: Our next case is a man who was an example of some of the problems of intermittent fibrillation. He is now very ill indeed.

Appointments of Speakers

A. G. MACGREGOR, M.D., F.R.C.P., Professor of Therapeutics and Pharmacology
J. C. PETRIE, M.B., M.R.C.P., Lecturer in Therapeutics
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Case 3—Atrial Fibrillation: Valvular Heart Disease

HOUSE PHYSICIAN: This man is aged 52 and has not worked for over two years. He had rheumatic fever in childhood and ten years ago, after increasing breathlessness on exertion, he was found to have mitral stenosis. Soon after that he had his first attack of atrial fibrillation but returned to sinus rhythm within 24 hours. Weeks later he was readmitted with atrial fibrillation and was started on a long-term anticoagulant and digoxin. On that occasion he remained in fibrillation.

PROFESSOR MACGREGOR: That is what you would expect. The climate existed in which fibrillation could occur and digoxin, as we have discussed, favours the rhythm. In this