



NEWS LETTER

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THE
SCOTTISH SOCIETY
OF ANAESTHETISTS

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SCOTTISH SOCIETY OF ANAESTHETISTS

COUNCIL FOR 1984-85

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Glasgow	Dr J. VANCE	1985
	Dr J. COLLINS	1986
Inverness and North	Dr R. JOHNSTON	1986

PROGRAMME FOR 1985

REGISTRAR'S PRIZE: Entries to be submitted to the Secretary by 28th February, 1985

ANNUAL GENERAL MEETING: Peebles Hotel Hydro, 26th-28th April, 1985

REGISTRAR'S MEETING: Royal Infirmary, Glasgow, 7th June, 1985

SCIENTIFIC MEETING AND GILLIES LECTURE: Royal Infirmary, Edinburgh, 15th November, 1985

ANNUAL GENERAL MEETING: Peebles Hotel, Hydro, 26th-28th April, 1985

REGISTRAR'S MEETING: Royal Infirmary, Glasgow, 7th June, 1985

GOLF OUTING: Bruntsfield Links, Edinburgh, 11th June 1985

President's Newsletter



The Society continues its well established course, combining a nicely balanced blend of social and scientific activity. The new Office Bearers, who took over in 1983, have proved worthy successors in office and are conducting the Society business in exemplary fashion. Along with the help of the Council Members, their efficient management has allowed me, happily, to assume a very passive role as "figurehead." It is my pleasure to acknowledge my debt and that of the Society, to them for their diligence and competence.

The Annual Meeting in 1984 returned to Aviemore. We were fortunate to enjoy superb weather. It must have been the first time at Aviemore that the golf outing was not played in near blizzard conditions. It was a great pleasure to welcome Michael Rosen from Cardiff, as our guest lecturer. He contributed notably to the scientific side and along with his attractive wife Sally, graced the social moments with their individual charm.

A new dimension has been added to the Society's social scene. A golf outing, conceived, incubated and delivered (without benefit of epidural block) by Bruce Scott, was held in June. The weather was glorious, the Gleneagles course magnificent: although a non-golfer I was graciously permitted to accompany the players—I cannot properly comment on the standard of play, but I can report on the huge enjoyment of all who participated. I suggested to Bruce that it be entitled the Bruce Scott Memorial Golf Outing, but for an obvious reason he demurred, but I hope it will become known as the Bruce Scott Annual Golf Outing, happily for many years to come.

The scientific side of our affairs is in good heart. Thanks to the efforts of the Secretary and Council the attendance at the Registrars' Meeting was much improved over that in the recent past. This was most rewarding for Sandy Buchan and his Edinburgh Royal Infirmary colleagues who were responsible for the high quality of the contents and organisation of the meeting. The Scientific Meeting in November attracted an excellent attendance, including a gratifying high proportion of younger members. Again, this was just reward for our Dundee colleagues who organised such an excellent programme. The choice of Dr Griffiths as Gillies Lecturer was particularly happy: his fascinating account of his anaesthetic life received much favourable comment from young and old.

This issue of the Newsletter is of special significance. It marks a mile-stone in the history of our Society, being the 25th edition of the letter. We are fortunate that our editor of the Newsletter, Bill Macrae, has enthusiastically and painstakingly prepared a special edition to mark the occasion.

We look forward to 1985 and the continuing success of our long-lived Society, now 70 years old. That our Society is so successful is a tribute to the continuing support of you, its members.

EDITORIAL

This year represents the 70th anniversary of the founding of the Scottish Society of Anaesthetists—the oldest anaesthetic society in the world. This is the twenty-fifth edition of the Newsletter, and in order to celebrate this milestone, I asked various members of the Society from each of the regions of Scotland to write historical contributions. The choice of authors was a personal one, and I asked for articles that were reminiscences rather than factual surveys. Each author has interpreted his remit in a different way, so that there is great variety, and I am sure that readers will find these articles fascinating as well as entertaining. They are a graphic reminder of how young our specialty is and what enormous progress has been made since that day in February 1914, when twelve anaesthetists founded the Society at the Balmoral Hotel in Edinburgh. I would like to thank the authors of these articles, Dr Frank Holmes from Edinburgh, Dr I. M. Campbell Dewar from Glasgow, Dr J. A. Bolster from Inverness and Dr Ian Lawson from Dundee. Readers will notice that there is no history of the Society in this Edition. The reason for this, is that Dr Lawson Davidson chose the History of the Society as the subject of his Presidential Address in 1979. As this ground has been covered recently, I felt that a repeat was unnecessary. However, I felt that we should have something about the Society and I am most grateful to Dr David Wright for his contribution.

At present, there are, to my knowledge, only two complete collections of all the Newsletters. One is kept by the Editor and the other belongs to Dr Malcolm Shaw, the first Editor of the Newsletter. Dr Shaw has generously offered his collection to the Society. With the support of the Council, I am hoping to try and collect enough complete editions of the Newsletter to donate a copy to each of the University Medical Libraries in Scotland and perhaps to individual hospital libraries, if sufficient editions can be assembled. I would be very grateful to any member who has copies of any of the first ten editions (1960-1969) and would be prepared to donate them to the Society. They could either send them directly to me or write to me to arrange collection.

Finally, I would like to thank all those who have contributed to this year's Newsletter. If, after reading the historical articles any members feel inspired to write accounts of their own experiences in the early years of anaesthesia, I would be delighted to consider them for inclusion in future Newsletters. I fear that if we do not commit these memories to paper soon, they will be lost forever.

PRESIDENT'S CHAIN

1914	Dr D. C. A. McCallum	1960	Dr A. Tindal
1919	Dr J. Paton Boyd	1961	Dr J. W. L. Bain
1920, 21, 36	Dr J. Johnston	1962	Dr Margaret Muir
1920, 30	Dr H. Torrance Thomson	1963	Dr Alex C. Forrester
1922, 27	Dr A. Ogston	1964	Dr J. D. Robertson
1922	Dr D. Lamb	1965	Dr A. G. Miller
1923	Dr J. H. Gibbs	1966	Dr J. A. Bolster
1924, 33	Dr H. P. Fairlie	1967	Dr A. W. Raffan
1925, 34	Dr A. Mills	1968	Dr J. R. Kyles
1926	Dr J. S. Ross	1969	Dr M. Shaw
1928	Dr W. Barras	1970	Dr K. C. Grigor
1929	Dr J. Ross MacKenzie	1971	Dr D. W. Shannon
1931	Dr W. Wood	1972	Dr J. Crawford
1932	Dr D. S. Middleton	1973	Dr W. N. Rollason
1935	Dr W. B. Primrose	1974	Dr F. Holmes
1937	Dr D. Kier Fisher	1975	Dr H. Fairlie
1938	Dr J. D. Stewart	1976	Dr D. Beaton
1950	Dr J. Gillies	1977	Dr J. I. M. Lawson
1951	Dr H. H. Pinkerton	1978	Dr A. H. B. Masson
1952	Dr T. J. C. Macdonald	1979	Dr L. D. Davidson
1953	Dr W. M. Shearer	1980	Professor D. Campbell
1954	Dr I. M. C. Dewar	1981	Dr A. C. Milne
1955	Dr F. Gibbs	1982	Dr A. J. Booth
1956	Dr H. B. Wilson	1983	Dr D. B. Scott
1957	Dr R. Lawrie	1984	Dr H. Y. Wishart
1958	Dr R. N. Sinclair	1985	Professor Sir Gordon Robson
1959	Dr Alison Ritchie		

ANNUAL GENERAL MEETING—AVIEMORE

APRIL 27th-29th, 1984

The Annual General Meeting returned to the Post House at Aviemore this year. The meeting started on Friday afternoon with a golf match at Boat of Garten Golf Club. Mrs Anne Gray won the ladies section and Dr Greg Imray was the victor in the men's match. The fishing competition on Lochindorb was won by Dr Don Robertson, and Dr Hamish Finlay captained the curling match.

The main part of the meeting took place on Saturday, with business in the morning and scientific presentations in the afternoon. The Presidential address, Guest lecture and Registrar's prize paper are printed as usual to allow those who couldn't attend to benefit from the pearls of wisdom.

In the evening there was a party for the children and a dinner for the adults. Beautiful weather contributed to making this a very successful meeting. Next year we meet at Peebles and let us hope the weather is kind to us again.



As a clinical anaesthetist I sought a subject or theme from my anaesthetic practices—or prejudices as some might think—to present to you today. Over the 40 years I have been an anaesthetist there has been an enormous increase in the number of anaesthetic agents available, a very welcome understanding of their pharmacology and pharmacokinetics and a welcome and necessary development of monitoring necessitated in large part by the physiological consequences of their administration, particularly of the newer agents. There has been renewed interest in the route of administration—regional anaesthesia is currently enjoying a well deserved resurgence; the intravenous route—so called total intravenous anaesthesia—has its devotees, although such a method of anaesthesia still requires control of the airway and ventilation, often involves nitrous oxide as a component and there is no satisfactory measure of depth.

The inhalation route is, however, still the most widely practised in the United Kingdom. Professor Papper on his admission to Honorary Fellowship of the Faculty of Anaesthetists, discussing mainly the qualities and characteristics of inhalation agents, was concerned with their safe and efficient administration. He described the lung, very happily I believe, as a delay organ for the uptake and distribution of inhaled substances, including oxygen. This delay contributes to smooth control and attainment of steady states of anaesthesia while the essential functions of respiration are maintained. Papper thought that the inhalation route was the perfect one, which will be with us for many years to come. I wholeheartedly agree with this and believe that we should be concerned not only with desirable agents, but with their delivery. Today I choose to discuss the use of Low Flow Systems in present day practice.

Conway classifies breathing systems as either "open" or "closed." A closed system is one which allows only inhalation of gases delivered from an anaesthetic machine.

Closed systems can be subdivided broadly into:

(1) systems in which CO₂ is not absorbed, as in partial rebreathing systems of the Mapleson A type, or non-rebreathing as with the Ruben Valve and
 (2) systems in which CO₂ is absorbed—these can involve spillage in which fresh gas flow is either greater than 2 L/min or less than 2 L/min, or totally closed in which fresh gas flow equals gas uptake. The important factor in these alternative systems is the volume of the fresh gas flow. When CO₂ is not absorbed the fresh gas flow must be at least equal to minute volume of ventilation, as in the Mapleson A and Ruben Valve circuits.

When CO₂ is absorbed fresh gas flow may be less than the minute volume of ventilation. With a fresh gas flow

greater than 2 litres per minute the inspired concentrations of gas and vapour closely follow those in the fresh gas. With a fresh gas flow less than 2 litres per minute the inspired concentrations may deviate significantly from the concentrations in the fresh gas.

It is in this latter mode, that is, with a fresh gas flow less than 2 litres per minute, that I am concerned today.

Closed systems with CO₂ absorption (generally called a 'closed circuit') were popular in the United Kingdom between the 1930's and the late 1950's. The introduction of Cyclopropane in 1933 necessitated, for reasons of economy, the use of a Waters to and fro or Sword's circle system. In the case of ether the high concentration needed to secure muscular relaxation was more readily attained. With both these agents the carrier gas was oxygen alone, so there was no likelihood of an hypoxic mixture developing. Nitrous oxide was not used in a low flow or totally closed circuit until 1956 when Woolmer described the use of the paramagnetic oxygen analyser to allow safe closed circuit nitrous oxide/oxygen anaesthesia. When nitrous oxide was used the Magill system was preferred ensuring that the oxygen concentration of the fresh gas was that inspired, although it is interesting to recall that 20% oxygen was considered adequate in those far off days.

A decline in the popularity of closed systems took place in the late 1940's and early 50's. This decline stemmed from various profound changes which were occurring in anaesthesia. Muscle relaxants were introduced in 1948; the concept of balanced anaesthesia was developed and Eger developed the MAC concept in the 1960's. The idea of providing adequate muscle relaxation, narcosis and analgesia as individual components of the anaesthetic led to the widespread use of nitrous oxide supplemented by the new agent Halothane, with or without muscle relaxant drugs. The predictability of inspired gas and vapour concentrations was obviously important. With a Magill circuit, using modern accurate flow metres, and temperature and flow compensated vaporisers, the inspired gas and vapour concentrations could be predicted and there was no problem of CO₂ disposal provided alveolar ventilation was adequate. These considerations led to the widespread adoption in the United Kingdom of high flow systems. The availability of ample supplies of gases and volatile agents and their relative cheapness did nothing to encourage thoughts of economy or of reduction of waste. The predictability of gas and vapour concentrations in each inspiration with the high flow system gave a sense of security to the new generation of anaesthetists brought up on the concept of MAC. Indeed it has been suggested by Little that the concept of MAC along with calibrated vaporisers has lessened the traditional ability of anaesthetists to estimate depth of anaesthesia from clinical signs.

In recent years the need for economical use of the increasingly costly new agents and an awareness of the undesirability of atmospheric pollution has led to a resurgence of interest in the United Kingdom into the use of low flow systems. My colleagues and I have been re-examining the practicability of using a low flow system and trying to assess the monitoring needs for its safe use.

The main considerations that arise are the factors involved in using volatile agents in a low flow system and the effect of adding nitrous oxide as a constituent of the fresh gas flow in such a system.

A volatile agent can be vaporised either outside the circle (VOC) or inside the circle (VIC)—there are limitations peculiar to each method, which were examined in 1960 in a classic theoretical study by Mapleson.

With the vaporiser outside the circuit as the fresh gas flow is reduced the inspired Halothane concentration for each vaporiser setting falls. With the vaporiser inside the circle the opposite occurs: as fresh gas flow is reduced the inspired Halothane concentration for each vaporiser setting rises. These predictions assume ventilation is constant. Mapleson predicted that a rise in ventilation with the vaporiser inside the circle would lead to a further rise in Halothane concentration and that with the vaporiser outside the circle a rise in ventilation would cause a small fall in Halothane concentration.

Mushin and Galloon in the same year compared in clinical practice the results of placing the vaporiser outside or inside the circle.

With the vaporiser outside the circuit the main factor governing the in-circuit concentration is the fresh gas flow. For any vaporiser setting the smaller the fresh gas flow the lower the concentration in the circuit. As fresh gas flow is increased the nearer will in-circuit concentration approach the control setting of the vaporiser. The inspired concentration will always be lower than the vapour concentration for any tap setting.

With the vaporiser inside the circuit the main factor is the minute volume of ventilation. The higher the ventilation the higher the concentration for any tap setting. Some self regulation occurs: as concentration rises, anaesthesia deepens and ventilation decreases and so the rate of vaporisation is reduced.

We have looked at the resulting concentrations in clinical practice using Cyprane temperature and flow compensated vaporisers outside the circuit. A mass spectrometer, a Penlon U-V halothane analyser or an Emma multi-vapour analyser was used to analyse the concentration of the volatile agents in the circle. With one litre of 50% nitrous oxide in oxygen as a fresh gas flow, the resulting in-circuit concentration lies between one-third and one-half of that shown on the tap setting. With half a litre of the same gas mixture flowing the resulting in-circuit concentration is a quarter or less of

that shown on the tap setting.

These results were reliably reproduced between subjects and using either Halothane, Enflurane or Isoflurane. This predictability of inspired concentration allows me to use VOC with confidence and even without a vapour analyser if one is not available.

A practical consideration of VOC, using the standard 5% Fluotec when fresh gas flow is 1 litre or less is the inability to deliver sufficient mass of agent necessary for induction of anaesthesia. This deficiency can be overcome by using either a high output vaporiser, such as an 8% Fluotec, or by using an initial higher fresh gas flow of 2 litres or more—which high flow incidentally gives the added benefit of rapid nitrogen washout, which will be mentioned later.

Saturated vapour may be added to the circuit from a copper-kettle type device. Thus a high concentration of anaesthetic vapour can be supplied to the circuit and the in-circuit concentration can be readily calculated. I have no experience of such a device but I suspect that it may be the method of choice in the future.

My experience of vaporiser in the circuit has been limited in recent years, as the non-calibrated low-resistance vaporisers of yesteryear are no longer available.

The Goldman vaporiser is available and its safety lies in its inefficiency. It can deliver a maximum of 3-4% Fluothane but the concentration falls rapidly with time as the liquid cools. A modern, temperature controlled, draw-over vaporiser, can be placed in the circuit. Mushin & Galloon's predictions are fully borne out: the concentration in the circle depends on minute volume of ventilation and the concentrations obtained were always higher than the tap settings and with a high minute volume a very rapid rise in concentration resulted. I believe that with a vaporiser in the circuit a reliable vapour analyser is essential for safe control.

Vaporisation in the circle can be achieved by injection liquid anaesthetic as aliquots, or continuously by syringe pump, into a part of the system where it will vaporise and mix before reaching the patient.

A vapour condensing disc may be adapted for use as a vaporising chamber, placed in the expiratory limb of a circle system. If 0.5 ml aliquots of liquid Halothane, Enflurane or Isoflurane are injected into the device, a peak concentration is reached rapidly after each injection, with a decrease of in-circuit concentration with time as the drug is redistributed in the system and taken up from the alveolus. One can detect the prolongation of the mixed concentration with time. The initial high peaks have little physiological effect because of the delay effect of the lung on uptake.

Injecting Enflurane by syringe pump into this vaporising chamber at an initial high rate of 90 ml/hr, is reflected in a rapid increase in concentration; on reducing the rate to 5 ml/hr a steady concentration of Enflurane of about 1.2% is established. It is of interest that this method of

in-circuit vaporisation seems to be uninfluenced by changes in ventilation. A patient who was having intermittent positive pressure ventilation had her ventilation reduced from 7 l/min approximately to 3½ l/min without any effect on the in-circuit concentration of Enflurane.

More sophisticated arrangements of syringe pumping with servo-controlled feed-back mechanisms are possible, as described by Dr David White of Northwick Park, but such a system is not readily available outside a research establishment.

With either method of liquid injection a vapour analyser in the circuit is essential for safe control.

To summarise, it is entirely practical to use a low flow system without oxygen analysers or vapour analysers, if oxygen is used as the carrier gas and a vapouriser is *outside the circuit* and the usual signs of depth of anaesthesia are observed.

The use of oxygen as the sole carrier gas may not attract all anaesthetists. Some would fear a progressive alveolar collapse or that the side-effects of a volatile agent such as Halothane would be exaggerated if higher concentrations had to be used to compensate for the loss of the contribution made by nitrous oxide to the level of anaesthesia.

The use of nitrous oxide in the low flow system introduces a complex but predictable pattern of changes in the gas composition with time. The oxygen concentration, the most important consideration in the circuit, is determined by the balance between its proportion in the fresh gas flow of nitrous oxide and oxygen and the uptake by the patient of oxygen and nitrous oxide. The amount of nitrogen in the circuit also influences the concentrations of oxygen and nitrous oxide. Let me first consider the elimination of nitrogen from the system. The lung FRC contains about 2 litres of nitrogen. In a high flow system this nitrogen is rapidly eliminated from the lungs and circuit. With a fresh gas flow of 6l/min, the nitrogen falls to 5% or less within 5 minutes.

With low flow systems nitrogen wash-out is much slower. For the nitrogen to fall to 5% or less with a fresh gas flow of 1 l/min takes some 20 minutes. A fresh gas flow less than 1 litre would obviously take even longer. An initial high flow, greater than 2 litres, not only will eliminate nitrogen from the circuit more rapidly, but will also deliver the mass of agent necessary for induction of anaesthesia, when VOC is used.

Let me now consider the results on gas composition in the circuit of adding nitrous oxide.

In 1975 Barton & Nunn showed that nitrous oxide uptake in fact varies inversely with the square root of time, i.e. gradually decreases as administration continues. In contrast oxygen consumption remains relatively constant. The implication is that if fresh gas N₂O/O₂ ratio is unchanged as nitrous oxide uptake decreases with time and oxygen consumption remains

constant there will be a tendency for nitrous oxide to accumulate gradually causing the oxygen concentration as a proportion of circuit content to fall. With a very low fresh flow in which oxygen supply approaches oxygen consumption, this change is likely to occur sooner and a hypoxic mixture is likely to develop.

Many workers have examined the variability of oxygen concentration between patients when using low flows of nitrous oxide and oxygen in fixed proportions. All agreed that as fresh gas flow was reduced the oxygen concentration in the circuit decreased as expected. Some found considerable variation in oxygen concentration at any given time between patients, probably reflecting different metabolic rates. In 1977, Holmes and Spears developed a mathematical model of what they called a very nearly closed circuit system, using premixed 50% nitrous oxide in oxygen as fresh gas, to predict the likely oxygen concentration within the system at different fresh gas flows. Holmes and Spears' model was of a circle system of 4 litres capacity to which they added 2 litres for FRC, a total of 6 litres. Oxygen consumption was assumed to be 225 ml/min nitrous oxide uptake was calculated from Severinghaus' formula. The model was used to predict the oxygen concentration that would result within the breathing circuit when using the nitrous oxide/oxygen mixture as fresh gas at two different flow rates.

With a flow rate of 1 l/min of Entonox Holmes and Spears predicted that the O₂ concentration will rise gradually to a peak within the first 20 minutes, as N₂O is preferentially taken up, and then decline slowly and become relatively constant at about 40% over 4 hours.

Using a flow of 0.5 l/min of Entonox the prediction is that O₂ content will fall to near hypoxic levels within 30 minutes. Even after preliminary preoxygenation and denitrogenation the model predicted similar oxygen concentrations at the two fresh gas flows. This paper stimulated considerable interest among a number of us at the Western Infirmary, in particular Professor Spence, Robin Allison, David Weatherill and myself. We were fortunate to have available a mass spectrometer and its attendant magician, Bill Davis, and we were therefore in a position to carry out clinical investigations to examine these interesting predictions.

Robin Allison examined the use of a 50% nitrous oxide/oxygen mixture, Entonox, delivered from an accurately calibrated flow meter to a standard Boyle Mark III circle system for patients undergoing major gynaecological surgery. The patients either breathed spontaneously after subarachnoid block or were artificially ventilated. Having obtained a steady state in oxygen concentration of 35%, by adding nitrous oxide as required, the fresh gas flow was altered to that flow necessary to maintain the oxygen concentration at 35% for 30 minutes. The flow required to maintain a constant oxygen concentration of 35% varied over a range of fresh gas flow between 300ml and 800

ml/min. The prediction of Holmes and Spears that a flow rate of 500 ml/min would result in a hypoxic level was not sustained in the case of some of these patients. The wide scatter of flows with a maximum required fresh gas flow of 800 ml/min does support the hypothesis that a fresh gas flow of 1 litre of Entonox could provide a safe oxygen concentration in all patients. A further study was undertaken to determine the oxygen concentration in a circle system using steady fresh gas flows of 1 l or 0.5 l of Entonox or a 50/50 nitrous oxide/oxygen mixture throughout the duration of surgery. Patients undergoing a variety of procedures were allowed to breathe spontaneously, through a tracheal tube. The oxygen concentration in the expiratory limb of the circle was noted every 5 minutes, using a fuel cell analyser.

The results showed clearly that in the 150 cases studied the oxygen concentration in the circle never fell below an acceptable level. At 0.5 l/min there was a tendency for the overall oxygen concentration to be at a slightly lower level throughout than when the flow was 1 l/min. At 0.5 l/min, of course, the oxygen content of the fresh gas flow is approaching presumed oxygen consumption and at 0.5 flow the spillage from the system is less and possibly nitrogen wash-out is less.

From the results of these studies I feel that it is reasonable to conclude that a fresh gas flow of 1 l/min of a 50% nitrous oxide/oxygen mixture will provide a practicable and safe low flow anaesthetic technique which will ensure adequate oxygen concentrations within the circuit, even for long operations and probably without the need for oxygen analysis. The results of the 500 ml/min study might encourage the use of a 50% nitrous oxide/oxygen mixture at flows less than 1 litre but at such flows I regard the use of an oxygen analyser as mandatory to guard against those few cases in which oxygen metabolism is unexpectedly high.

Given that the use of a low flow system as described is safe, with monitoring of the circuit gas and vapour concentrations as appropriate, together with observation of clinical signs of anaesthesia, what advantages are there over using such a High Flow System? From the standpoint of economy and atmospheric pollution the method offers obvious benefits and can be used not only with spontaneous respiration but with IPPV methods if the appropriate ventilators are available.

In addition there are two aspects of importance in present day anaesthetic practice I should like to touch on.

PATIENT SAFETY

Patient safety is of immediate concern to all anaesthetists. It may appear to be making a virtue out of necessity, but the close attention during the conduct of low flow anaesthesia with the additional monitoring involved of in-circuit gas and vapour concentrations must be in the patient's best interests.

I was disturbed to read recently in a publication in Anaesthesia the opinion expressed by the authors, who included a household name in U.K. anaesthesia, that, and I quote—"closed systems are particularly dangerous if the oxygen supply is curtailed or threatened.

Closed system anaesthesia with interruption of oxygen flow is a death sentence for the patient." Now oxygen failure must be rare in the United Kingdom, but it may occur. With a high flow system such failure immediately results in a hypoxic mixture being inhaled. In the low flow system the gas capacity of a standard system is some 6 litres and represents a considerable reservoir of oxygen which will delay the development of an hypoxic mixture. In the circumstances of oxygen failure the low flow system is inherently safer.

TRAINING

The trainee anaesthetist should be exposed to as wide a range of technique as possible and the low flow system should be included. I am sure that the practical use of the low flow system enhances the trainee anaesthetist's knowledge and understanding of gas and vapour uptake. The trainee will be the better equipped to take advantage of the next generation of anaesthetic machines which will have oxygen and vapour analysers fitted as standard, and will be the better equipped to work in the rest of the world where low flow systems are commonplace.

I may have given the impression that the practice of low flow anaesthesia requires an array of sophisticated equipment and even more sophisticated staff for its successful use—a standard anaesthetic machine, circle absorber, gas and vapour monitors, mass spectrometer with its attendant Guru, Bill Davis, to check on the monitors, spirometer to measure spillage which is then analysed by the mass spectrometer and the results interpreted by a PhD, FFA anaesthetist of the calibre of David Weatherill. In practice using Entonox at a flow rate of 1 l/min with a vaporiser outside the circle, simple apparatus can be used successfully, as I have described and advocated enthusiastically I hope.

Professor Spence recently gave me an application form. In these days of elitist sub-groups in anaesthesia, there exists for those interested in such groups, a new one being formed in the United States of America. It rejoices, in an up-market acronym—CLASS—which stands for Closed and Low-Flow Anaesthesia Systems Society. Now surely the establishment of this in-group lends respectability to the method I have advocated enthusiastically today.

Thirty-five years ago I began my career with the circle absorption low flow system and I am much intrigued as, I near retirement, that the system is coming back into favour—one might say things have come full circle—and leave it to you individually to decide on the spelling of the word "full."

It is an outstanding honour to be invited to address the Scottish Society of Anaesthetists which is the oldest national anaesthetic society. If the anaesthetists and surgeons of 70 years ago returned to visit hospitals today they might ask, "How are practices in postoperative pain now—we were always dissatisfied about that." Much has happened; postoperative pain has been discussed at every World and European Congress ("What are they sir—they might say?") and many national and local congresses. It would have to be admitted that these emissaries from the past would see—little or no change, Morphine 10mg or Papaveretum 20mg I.M., as necessary 4 hourly would still be the common prescription.

Every anaesthetist wants to be safe. There is general agreement that opiates, although successful analgesics, can have serious side effects, especially respiratory depression. Clinicians may have heard of death in circumstances which cannot be easily explained even after a modest dose of morphine or pethidine. All are therefore understandably cautious. So that results—from the traditional approach which is relatively safe, and not likely to bring medio-legal catastrophe—are no better than in the past.

The standard approach—morphine 10mg p.r.n., 4 hourly—is limited by biological variation in response to pain so that a large variation in dose is necessary to produce good pain relief for every patient.

There has never been any problem in producing good pain relief with drugs like morphine, the difficulty has been to do so without producing dangerous respiratory depression. Administration of morphine regularly, either intramuscularly at fixed intervals or by intravenous infusion, seems attractive. Without the stimulus of pain to wake them up patients are more sensitive to respiratory depression. Patients who had an intravenous infusion of papaveretum had periods of apnoea with relative hypoxia. Many anaesthetists believe that this system has hazards. Only by controlling the infusion at a dose which is not going to relieve pain completely in a reasonable proportion of patients can it be made safe; that reduces the effectiveness. The level of danger, although small, is always present. Similar problems will arise from "regular" (4 or 6 hourly) intramuscular medication.

Self-administered analgesia is another approach. Although the method has been used in Cardiff for some time, it has been applied mainly as a pharmacological tool to compare analgesics so as to derive potency ratio, efficacy and duration of action after painful surgery—upper abdominal operations—for a 24 hour period. Information has also become available about the safety and efficacy of the method.

Self-administered analgesia is based upon the concept

that if pain is just suppressed then demand for more analgesic is eliminated. Therefore it is likely that the danger of respiratory depression will be minimal. It is crucial that the incremental dose is not too large to cause side effects, nor so small as to prevent pain relief ever being achieved. A minimum interval between one dose and another is programmed into the apparatus so that the patient can appreciate the full effect of one dose before demanding another. Most systems use a syringe pump with controls. The maximum dose the patient can demand depends upon the incremental dose, the minimum interval between demands and ultimately the total dose in the syringe.

There is no doubt that this method can produce good pain relief in most patients—much better than standard practice. A number of routes of self-administration have been examined, and self-administered intramuscular analgesia—doses available at 20 minute intervals—is a simpler system, which provides pain relief similar to intravenous analgesia, although a slightly larger dose is required.

In many hundreds of patients there has not been a problem with respiratory depression. Respiratory studies, measuring end-tidal carbon dioxide concentration through a nasal catheter have only been made for a few hours postoperatively; there was no evidence of respiratory depression. However, monitoring for the whole period of treatment is also necessary to prove safety; and these studies are being conducted at present.

Overdose of agonist-antagonist or partial agonist drugs are presumed to cause limited respiratory depression. Studies in Cardiff showed respiratory depression with meptazinol, buprenorphine and nalbuphine, and only with the latter has there been a "ceiling" depression. Like morphine these drugs can cause irregularities in respiratory rhythm, including apnoeic periods. It is interesting to speculate whether hypoxia during such apnoeic spells may be the mechanism of sudden unexpected death even with "moderate" doses of opiates.

Epidural or intrathecal opiates are still a cause for concern since occasional severe respiratory depression has been reported. This inhibits most clinicians from using this method in the surgical ward.

Local analgesic techniques could make a substantial contribution to pain relief but are not commonly used. Intercostal and ilioinguinal blocks provide good pain relief although of a limited duration. Nevertheless, recovery from general anaesthesia is a difficult time to judge narcotic analgesic dosage. Local anaesthesia is especially useful in that transition period leading to a comfortable and satisfactorily awake patient before narcotic analgesics are required.

Epidural analgesia with local anaesthetic has been administered by a bolus "top-up" or by infusion. The intermittent bolus is time consuming, involving similar difficulties of timing and decision to 'p.r.n.' intramuscular injections. In addition, when the block wears off the patient can be left in severe pain. An infusion is a far more attractive concept but, still causes concern in case of accidental intrathecal injection with a resulting massive spinal block. It therefore requires supervision. It is possible that the use of a low concentration of local anaesthetic—0.1% or 0.125% bupivacaine—at a limited volume flow rate (10-10ml/hour) will prove safe and reasonably effective. By requiring the nurse to make relatively simple observations at intervals, such as checking the level of the block or movement of the legs, it may be possible to ensure a satisfactory safe system.

Every approach carries question marks on safety so that only expert supervision will satisfy the anaesthetist using unusual methods of pain relief. Advancing progressive patient care has resulted in the introduction of a High Dependency Unit (H.D.U.) in Cardiff in a surgical ward of 8 beds turned into a 7-bedded unit, which is in constant use. It is not an Intensive Care Unit; there is no assisted ventilation. There are always 3 nurses in the unit so that if one leaves for a period there are always two nurses available to treat respiratory or cardiac arrest. The total nurse requirement to service the H.D.U. is 14.5 wholetime equivalents per week. It is somewhat more expensive than routine care although there is some saving of nurses on other duties. The additional cost is about £30.00 per patient per day, most patients remaining in the H.D.U. for about 24

hours. The additional capital cost is small, mainly for pulse monitors, electrocardiographs, thermometers and infusion pumps. These are constantly in use so provide a high efficiency of utilisation.

This capacity has allowed about 20% of postoperative patients to enter the H.D.U. If it were extended to all suitable cases a capacity about two or three times larger would be required. The H.D.U. allows the opportunity to practice many analgesic techniques under adequate supervision.

Another approach that is being examined, is the provision of a reliable warning of respiratory depression. By coupling chest wall movement with that from the suprasternal notch, where there is a negative intrathoracic pressure, and integrating these a reliable signal can be obtained. A trial is being conducted with this instrument to assess reliability over prolonged periods in detecting apnoea.

Progress has been slow. However, advances which are *now* available, particularly the High Dependency Unit should enable anaesthetists to put into action many of the efficacious techniques now available; and to reduce hazards to negligible proportions. The introduction of the High Dependency Unit should offer little difficulty to those who have, against determined opposition, introduced the recovery room, and intensive care unit, obstetric analgesic services, and pain clinics. Then the anaesthetists of today can say to their predecessors "Yes you can see the happy faces of those who have good pain relief." Surely, for postoperative pain relief—the time is now!



EPIGASTRIC IMPEDANCE—A NEW METHOD TO MEASURE
GASTRIC EMPTYING RATE IN MAN?**INTRODUCTION:**

Gastric emptying rate is important in relation to anaesthesia for three reasons: (1) the absorption of any orally administered drugs given as premedication or as normal therapy will be delayed by delayed gastric emptying; (2) the volume of gastric contents may be increased by delayed gastric emptying and therefore the risk of inhalation of gastric contents during the induction of anaesthesia will be increased; (3) delay in gastric emptying post-operatively will increase the volume of gastric contents and may increase the incidence of nausea and vomiting in addition to delaying the return to normal feeding.

Several methods have been described to determine gastric emptying rate in man but most are impracticable in the post-operative period. Radiological, radioisotope, solute absorption methods and gastric aspiration methods have all been used in the measurement of gastric emptying rate in man but all have disadvantages or may affect gastric emptying rate themselves. Real time ultrasound is simple and non-invasive but expensive apparatus is required.

Epigastric impedance is a novel, simple, non-invasive method in the initial stages of development. This method would have wide appeal in that it is inexpensive, portable and acceptable to patients.

The aim of the present study was to assess the 'impedance epigastrograph' as a method of measuring gastric emptying in healthy volunteers and to compare the results with those obtained using the rate of paracetamol absorption after oral administration as an index of gastric emptying.

METHODS

The impedance epigastrograph is an instrument which measures the resistance to a small alternating current applied to the skin and detected through 4 adhesive electrodes, two on the anterior abdominal wall and two dorsally. Recordings are made with the volunteers lying supine. Following detection, the voltage is amplified and displayed on a chart recorder.

In the first study the aim in using this apparatus was to assess the reproducibility of the method in 2 volunteers studied repeatedly. After at least a 4 hour fast the

electrodes were applied as described and the subject lay supine until a stable baseline impedance value and recording were obtained. The subject then drank 500ml of orange squash, through a tube over 2 minutes while remaining supine. This procedure was repeated on 5 or 6 occasions separated by at least 3 days.

In the second study seven healthy volunteers were studied on 3 occasions separated by at least a week. On each occasion, after a 4 hour fast, the subject received one of the following premedications intramuscularly: saline—1ml, i.m.; metoclopramide—10mg, i.m.; nefopam—20mg, i.m. Metoclopramide is known to accelerate and nefopam to delay gastric emptying.

Twenty minutes after an injection, at a time when the impedance epigastrograph electrodes were in place and the baseline was stable, the subjects swallowed the 500ml of orange squash over 2 minutes which contained paracetamol 1.5 grams in solution for simultaneous measurement of the rate of paracetamol absorption. Venous blood samples were taken at frequent intervals for 7 hours and plasma paracetamol concentrations were measured by high pressure liquid chromatography. All subjects remained supine for 2 hours after the drink. They did not eat, drink or smoke during this period.

CALCULATION OF RESULTS:

The rate of gastric emptying was determined by measuring the height of the impedance trace above the baseline every minute and plotting the logarithm of these heights against time. A straight line was obtained. The first order rate constant (Kge) was calculated from the equation:

$$K_{ge} = \text{slope} \times 2.303$$

The half-life of gastric emptying was calculated from the equation:

$$T_{1/2} = \frac{0.693}{K}$$

The rate of paracetamol absorption was estimated from the peak paracetamol concentration (Cmax) and the time to achieve this peak concentration (Tmax). In addition, an estimate of the first order rate constant for absorption (ka) was obtained by 'curve stripping.'

Values were compared using Student's 't' test.

RESULTS:

Study one showed that the rate constant for gastric emptying was remarkably consistent for each volunteer on 5 or 6 occasions with coefficients of variation of 13 and 21%.

Study two is still in progress. However, the results available show that after saline premedication gastric emptying and paracetamol absorption were rapid. Neither were significantly influenced by prior administration of metoclopramide. After nefopam premedication there was a highly significant delay in gastric emptying and paracetamol absorption. The half time of gastric emptying was prolonged from 5.4 minutes after saline to 13.3 minutes after nefopam. The time of the peak paracetamol concentration was prolonged from 55.0 minutes to 78.8 minutes.

After nefopam, gastric emptying pattern did not always conform to a single exponential process and sometimes a lag period at the beginning or during emptying was seen. This pattern has been previously reported after opioid analgesics. After saline and metoclopramide the absorption rate constants for paracetamol absorption were almost identical to the gastric emptying rate constants.

CONCLUSIONS:

- 1) The 'impedance epigastrograph' is a safe, simple to use non-invasive, reproducible method of measuring gastric emptying rate.
- 2) Nefopam produces a significant delay in gastric emptying rate as detected by the 'impedance epigastrograph' and by a delay in paracetamol absorption.
- 3) Neither method detected a change in gastric emptying rate after metoclopramide—10mg, i.m. This may be due to a variety of factors but is likely that variation in the absorption of metoclopramide from the intramuscular site reduces the effect observed.
- 4) Initial attempts to correlate Kge and Ka after saline and metoclopramide are good.
- 5) Further study of the 'impedance epigastrograph' is indicated. Useful information about gastric emptying rate may be obtained at the bedside.

REGISTRAR'S MEETING

ROYAL INFIRMARY, EDINBURGH, JUNE 8th, 1984

This year's meeting attracted 48 registrars, from all parts of Scotland. Following a welcome from Dr Hugh Wishart, our esteemed President, those attending split up into three groups and attended demonstrations.

One group went to the anatomy and X-ray departments. First they were shown the anatomy of the brachial plexus and methods of blocking it.

Next indications for monitoring central venous pressure were discussed and methods demonstrated, stressing the problems and complications. Thirdly, Dr David Littlewood demonstrated his technique for percutaneous lumbar sympathectomy using phenol, under X-ray control.

The second group saw demonstrations on post-operative care and monitoring of patients after cardiac bypass, the transfer of critically ill patients and high frequency jet ventilation.

The third group went to the Simpson Memorial Maternity Pavilion where they visited the neonatal intensive care unit and saw demonstrations of epidurals in the Labour Ward and of hysterectomy under epidural and general anaesthesia.

After lunch, papers were presented by registrars from the Department at the Infirmary. Dr Alastair Watt discussed the aetiology and prevention of hypotension during elective caesarian section. He presented the results of a trial to evaluate the use of leg stockings to prevent hypotension which suggested that they were not of any benefit.

Dr Jeffrey Bowler presented a paper in which he discussed the use of continuous epidural infusion of 0.125% Bupivacaine for post-operative analgesia in gynaecology patients. Dr John Duggan reviewed the safety of intravenous regional anaesthesia and discussed the factors affecting the integrity of the tourniquet. He presented results of a trial which suggested that injecting the local anaesthetic quickly into an unexsanguinated arm could produce pressures that exceeded tourniquet pressure. By exsanguinating the arm, using a distal injection site and injecting slowly, pressures higher than the tourniquet pressure could be avoided.

In the final paper entitled 'Anaesthesia and the Law,' Dr A. H. B. Masson discussed the history of the laws relating to death during the peri-operative period. He then gave advice on how to deal with a death associated with an anaesthetic, and described how the Court of Session dealt with such cases. In summary, his advice was to be friendly and courteous to patients at all times, keep relatives informed and hide nothing from them, "when in doubt, take it out," and finally to pay meticulous attention to keeping careful notes.

The President closed the meeting with a vote of thanks to all those who had organised the meeting and contributed to it.

SCIENTIFIC MEETING DUNDEE, NOVEMBER 16th, 1984

This year's Scientific Meeting was held in Ninewells Hospital, Dundee. It was attended by over one hundred anaesthetists from all over Scotland, and it was particularly gratifying to see how many younger members were present. Dr Mel Milne is to be congratulated on his organisation of the Meeting which combined an interesting scientific programme with friendly and relaxed hospitality. There were two innovations at this year's Meeting. First, the runner up in the annual Registrar's prize, Dr W. J. D. McCulloch, presented his Paper at the Meeting and secondly, Dr G. Sharwood Smith, presented a poster about his survey into the use of hypnosis by anaesthetists in Scotland.

The meeting followed the traditional form with a morning session chaired by Dr Lawson, an afternoon session chaired by the President, and after tea the Gillies Memorial Lecture. This year's Gillies Memorial Lecturer was Dr H. W. C. Griffiths, and as usual, his lecture is printed in the Newsletter. I am sure that it will give great pleasure to all those who read it, but the written word alone cannot do justice to Dr Griffiths' presentation. The lecture was delivered with a style, wit and panache that kept his audience spellbound. A lively discussion followed his lecture, and it was with great reluctance that the President drew the meeting to a close with the presentation of the traditional Caithness glass vase.

POSTER PRESENTATION—A SURVEY OF THE USE OF HYPNOSIS BY SCOTTISH ANAESTHETISTS—Dr G. H. SHARWOOD-SMITH

The use of hypnosis remains a controversial subject, despite it being enthusiastically advocated for many applications. This survey was conducted to ascertain to what extent hypnosis is used by Scottish anaesthetists.

The survey took the form of a questionnaire which was sent to all practising members of the Society, of whom about 70 per cent completed and returned them. Although hypnosis only finds a practical application for a small minority of anaesthetists, interest in the subject is widespread and over 70 per cent found the use of suggestion an important part of the induction of general anaesthesia. Twenty per cent of Scottish graduates received undergraduate instruction in

hypnosis and 14 per cent of Consultants had attended a Postgraduate course. Consultants with an interest in chronic pain and terminal care were twice as likely to use hypnosis, while an interest in obstetric or dental anaesthesia had no significant effect on the numbers using hypnosis. Many anaesthetists would be interested in learning the technique of hypnosis if given the opportunity. The majority felt that hypnotherapy was a legitimate area of interest for anaesthetists and that difficulty in evaluating hypnosis scientifically need not exclude its use in practise.

IS THERE DANGER OF CYANIDE POISONING DURING ADMINISTRATION OF NITROPRUSSIDE?

A. R. BUTLER and C. GLIDEWELL,
Chemistry Department, University of St Andrews
W. I. K. BISSET, Ninewells Hospital, Dundee

Sodium nitroprusside ($\text{Na}_2[\text{Fe}(\text{CN})_5\text{NO}]$; SNP) is a valuable vasodilator but its use has been restricted because of reports that, both *in vitro* and *in vivo*, it decomposes in blood with release of cyanide. The analytical procedure upon which these reports are based requires that any cyanide still present as a ligand (i.e. not as free cyanide) is nonlabile. This is true of cyanide in nitroprusside where the metal is present as iron(II). However, for any complex ion

containing iron(III), cyanide ligands are labile and it is inevitable that, *during analysis*, the complex will decompose with release of cyanide. The action of light on nitroprusside results in the formation of aquapentacyanoferrate ($[\text{Fe}(\text{CN})_5\text{H}_2\text{O}]^{2-}$) which contains iron(III). So that any photochemical decomposition of SNP will give results which, on analysis for free cyanide, are ambiguous. Apparently positive evidence for free cyanide could be due to

the presence of the product of photochemical decomposition. The illumination of an operating theatre is sufficient to cause conversion of nitroprusside to aquapentacyanoferrate. *In vivo* experiments are even more difficult to interpret as the samples of blood removed for analysis must contain the metabolised product of nitroprusside after it has acted hypotensively. The analytical procedure used by previous workers is valid only if it is known that metabolism of nitroprusside does not result in formation of an iron(III) complex. To our knowledge no information on this matter is available, it cannot be that nitroprusside must release NO, as it does

on photolysis, to act hypotensively as the ruthenium analogue, $\text{Na}_2[\text{Ru}(\text{CN})_5\text{NO}]$, is photochemically stable but still hypotensive.

From a study of the carbon-13 NMR spectrum of nitroprusside, containing labelled cyano-groups, dissolved in blood, we obtained no evidence for decomposition over a period of 14 hours. The spectrum of nitroprusside remained unchanged and there was no sign of resonance due to free cyanide. We maintain that the case for the release of cyanide from nitroprusside by the action of blood is still not proven.

EXTRADURAL OPIATE ANALGESIA FOLLOWING CAESAREAN SECTION—Dr D. J. MACRAE

Following the first report of extradural opiate administration in man by Behar and colleagues in 1979, extradural phenoperidine and later diamorphine, had been used fairly extensively in Ninewells Hospital. Analgesia was clinically satisfactory, and no serious side effects had been noted.

It was thus decided to carry out a randomised, double-blind study of extradural opiate analgesia in patients who had undergone Caesarean section under lumbar extradural blockade. The study was designed to establish the intensity and duration of analgesia and the frequency of side effects of extradural diamorphine in comparison with another extradural opiate, phenoperidine and IM diamorphine.

Sixty fit patients agreed to take part in the study. Following extradural Caesarean section, they were randomly allocated to one of three analgesic regimes.

- (1) Intramuscular diamorphine 5 mg + Extradural saline
- (2) Extradural phenoperidine 2 mg + IM saline
- (3) Extradural diamorphine 5 mg + IM saline

On requesting analgesia, patients were visited by an anaesthetist observer and an initial assessment made. Vital signs were recorded, and a 10 cm. linear analogue pain score, and rank scores for pain, pain relief and sedation were completed. The presence of nausea, vomiting, itching and any other side effects were noted.

Following this assessment, the analgesic drug was administered, both observer and patient remaining blinded. Further assessments were made at pre-determined times, and patients were asked to request further analgesia if they wished, and on doing so they were withdrawn from the study. This time was then recorded as 'time to next analgesia.'

RESULTS:

Durations of analgesia, defined as 'times to next analgesia' were as follows (Significance by Students' T test).

	Mean \pm SEM (hrs)	Significance
IM Diamorphine	3.40 \pm 0.47	P 0.001 P=0.05
Extradural phenoperidine	5.96 \pm 0.43	
Extradural diamorphine	8.39 \pm 1.15	

Linear analogue pain scores, and rank pain scores showed the onset of analgesia was rapid in all groups. Significantly lower scores were achieved in the extradural groups than in the IM group at 30, 60 and 120 minutes, suggesting that analgesia was more profound in the extradural groups.

No serious side effects were recorded. Respiratory rates of less than 12 breaths per min were recorded in three patients. None of these rates were less than 10 breaths per minute and none of these slow rates was recorded after 120 minutes.

Nausea was reported in five of our 60 patients, representing all three analgesic regimes, and only two of these patients actually vomited. Itching was noted after direct questioning in 50% of patients at some time. However, in only one patient was this sufficiently distressing to require treatment.

Extradural opiate administration would thus seem to provide profound analgesia, of longer duration than a comparable intramuscular opiate and minimal side effects in post-Caesarean section patients.

The possibility exists of obliterating catecholamine output in the future.

Although the majority of lesions were in the adrenals other tumour sites were hilum of kidney, coeliac axis, abdominal aorta and bladder wall. The latter is the only malignant tumour in our series.

Pre-operative anti-hypertensive therapy included a variety of alpha- and beta-adrenoceptor blocking agents.

Recent work has shown the value of the calcium channel blocker nifedipine in reducing nor-adrenaline secretion (3).

Various groups have demonstrated marked rises in plasma catecholamines particularly during tumour manipulation (4). We have experienced difficulty in controlling arterial blood pressure during induction of anaesthesia and with tumour dissection. Heavy pre-medication, use of various muscle relaxants including atracurium and vecuronium (5), avoidance of halothane because of early problems with arrhythmias, maintenance with enflurane or isoflurane, and control of blood pressure with phentolamine and sodium nitroprusside were all discussed.

Finally, the value of pulmonary artery pressure monitoring in a patient with severe ischaemic heart disease and a left adrenal pheochromocytoma were illustrated.

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PROLONGED ENFLURANE ANAESTHESIA AND SERUM FLUORIDE ION LEVELS—Dr P. B. TAYLOR

Enflurane was first synthesised by Tyrell in 1963 and has been used as a volatile agent in general anaesthesia in the U.S.A. since 1971. Clinical trials were first carried out in the U.K. in 1970 and to date nearly 45 million anaesthetics have been given using enflurane world wide.

Work by Holaday Rehder and Chase compares its biotransformation with that of methoxyflurane and halothane and it has been shown to be metabolised considerably less than either of these volatile agents. Methoxyflurane like enflurane is partly metabolised to inorganic free fluoride ions and is known to be nephrotoxic, producing polyuric renal failure in a dose-dependent fashion. Enflurane, however, seems seldom to produce a fluoride ion level in serum of over 50 micromol/litre, considered the nephrotoxic level, though isolated cases have been reported in patients with pre-existing renal disease.

Since enflurane may well replace halothane as the most commonly used volatile agent (this has happened in the U.S.A. already) we set out to determine its safety when used in prolonged anaesthetics for major E.N.T. surgery.

Ten patients A.S.A. I to III were studied. Four were having total laryngectomies, one radical neck dissection and five parotidectomies. The shortest operation

lasted four hours and five minutes, the longest eight and a half hours. Pre-operatively informed consent was obtained and blood urine samples collected for urea and electrolytes, creatinine clearance, liver function tests, blood and urine osmolality and serum fluoride ion levels.

Anaesthesia was induced with thiopentone, suxamethonium for intubation and maintained with N₂O, O₂ and enflurane using a 10 l/min flow in a Bain circuit with spontaneous respiration. End tidal CO₂ and O₂ were measured and in two patients only was it considered necessary to change to I.P.P.V. because of an end tidal CO₂ over 70mmHg.

Serum fluoride ion levels were measured immediately post-op and at 3-4 hours, 6-8 hours and 16-20 hours post-op. Enflurane exposure was calculated as the sum of the products of the vapouriser setting and the minutes each setting was used.

Neither clinically nor biochemically did any of our patients show signs of renal problems and the peak serum fluoride ion level never reached the 50 micromol/l considered to be the nephrotoxic level. We feel we have shown it is safe from the renal toxicity point of view to administer enflurane to patients free of pre-existing renal disease for prolonged periods.

PROPOFOL (DIPRIVAN) EXPERIENCES WITH AN EMULSION FORMULATION

Dr NEIL McKENZIE

Propofol (Diprivan) is a new intravenous induction agent. Original work with the drug in the early 1980s revealed several attractive features particularly with regard to smooth induction and rapid trouble-free recovery, but these were largely outweighed by a high incidence of pain on injection and the incriminatory role of Cremophol EL, the drug's solubilising agent, in hypertensive reactions. A new formulation has now been achieved in a soya-bean oil emulsion and I report three studies with this.

1) DAY-CASE ANAESTHESIA

Propofol was compared with methohexitone and thiopentone for induction of anaesthesia in 60 patients undergoing minor day-case urological surgery. We found significantly smoother induction with propofol with considerably less injection pain than methohexitone or the cremophor formulation. Frequent cardiovascular and respiratory depression followed the induction dose of 2.5 mg/kg although this was not a problem clinically. Recovery was significantly faster after propofol, as assessed by sophisticated psychometric testing, and free from minor post-operative sequelae.

Propofol, therefore appeared an eminently suitable agent for day-case anaesthesia.

2) MAINTENANCE OF ANAESTHESIA BY INTERMITTENT BOLUS

Propofol was compared with methohexitone for induction and maintenance of general anaesthesia in 40 patients undergoing lower limb surgery under spinal blockade. Both agents proved practicable when given in this manner but propofol produced significantly smoother conditions, methohexitone causing much more excitatory phenomena and injection pain.

Respiratory and cardiovascular depression were commoner with propofol, but again unimportant clinically. Recovery was equally rapid after both agents as assessed by psychometric testing, but side-effects much less frequent with propofol.

A mean administration rate was calculated at 0.13 mg/kg/min for propofol and 0.09 mg/kg/min for methohexitone, giving valuable guidelines for the 3rd study.

3) MAINTENANCE OF ANAESTHESIA IN SPONTANEOUSLY BREATHING PATIENTS BY CONTINUOUS INFUSION OF PROPOFOL

A comparative study with methohexitone was abandoned after 10 pilot cases demonstrated a uniformly high incidence of involuntary movement, making surgery very difficult, and unacceptably poor recovery characteristics. Forty patients were therefore anaesthetised with propofol for orthopaedic surgery. All received an opiate premedication. Anaesthesia was induced with 2.0 mg/kg of propofol and maintained by continuous infusion via a syringe pump, decreasing from 0.3 mg/kg/min to 0.2 mg/kg/min after 10 minutes and adjusted thereafter on clinical grounds. All patients breathed nitrous oxide 66% in oxygen.

No problems have been encountered. Induction was impressively smooth and operating conditions excellent. Cardiovascular and respiratory depression allowed easy control of infusion rate and the quality of recovery was very good with minimal minor post-operative sequelae. The mean infusion rate was 0.25 mg/kg/min, double that of the previous study where analgesia was provided by regional blockade.

PHAEOCHROMOCYTOMA—A CONTINUING PROBLEM

Dr A. L. FORREST

Since 1974 thirteen patients, seven male and six females, average age of 40 years, have presented with catecholamine secreting tumours. Our operative rate is similar to other U.K. centres (1). Early recognition is vital as one third of these tumours are not diagnosed during life.

Embryologically, cells of the neural crest form sympathetic ganglia and the adrenal medulla. Extra-adrenal chromaffin tissue is found in paravertebral sites and in relation to the abdominal aorta. The chrome reaction of the mature chromaffin cell is due to oxidation of intracellular catecholamines when fixed by dichromate.

The main clinical feature was hypertension often accompanied by paroxysms of headache, sweating and palpitations. Associated medical conditions included neurofibromatosis (3), hypertension in pregnancy (2), familial (2) and a patient with medullary carcinoma of thyroid and bilateral phaeochromocytomas.

Initial diagnosis is based on finding excess metabolites of catecholamines in a 24-hour collection of urine. Localisation of the tumour has required I.V.P., aortography, and recently iodine-131-meta-iodo benzylguanidine (2). This guanethidine analogue has an affinity for chromaffin tissues and holds out great promise for assessing the extent of chromaffin tumours.

THE INFLUENCE OF OBESITY ON SPINAL ANALGESIA WITH ISOBARIC 0.5% BUPIVACAINE

Dr W. J. D. McCULLOCH

Following the clinical observation that a number of fat patients had unexpectedly high levels of analgesia after spinal anaesthetic with isobaric bupivacaine, it was decided to investigate the influence of obesity on spinal analgesia with isobaric 0.5% bupivacaine in a controlled study.

PATIENTS AND METHODS

Fifty patients aged between 51 and 89 were studied. All were having routine urological surgery.

Premedication was diazepam 10 mg orally given 60-90 minutes before spinal anaesthesia. Subarachnoid puncture was performed at the L3-4 interspace using a 22g needle (Yale) with the patient in the sitting position. After withdrawing a small volume of cerebrospinal fluid to check placement of the needle, 4 ml of plain bupivacaine 0.5% was injected over 10 seconds. The patient was placed supine for 5 minutes and thereafter in the lithotomy position. At 2, 5, 10, 15, 20 and 30 minutes after the injection arterial pressure and heart rate were recorded and the level of sensory analgesia was evaluated using a short bevelled needle. Analgesia was defined as loss of sensation to pinprick.

RESULTS

The mean age of the patients was 68.1 years (range 51 to 89 years), their mean weight was 72.5 kg (45 to 122 kg) and their mean height was 1.72 m (range 1.57 to 1.93 m). Operating conditions were satisfactory in all cases and the average level of analgesia was T7.

The maximum level of analgesia was plotted against patient age, height in metres, weight, weight/height, and weight/height squared for patients aged 60 to 80 years. Correlation between the height of block and the various factors listed above are shown in table 1.

DISCUSSION

The main finding of this study was that there was a positive correlation ($r=0.61$) between height of block and weight/height squared, which has been shown to be a good index of obesity, after spinal anaesthesia with 4 ml of plain bupivacaine 0.5% injected at the L3-4 interspace. I can only speculate why there should be a correlation between obesity and the level of spinal analgesia.

Robinson (1) showed that if the inferior vena cava was occluded the blood flow through the lumbar vertebral plexus increased. The vena cava may be more compressed in the obese patient due to the increased weight of the abdomen and if the epidural veins become distended the volume of cerebrospinal fluid may be reduced. This in turn could increase the spread of spinal anaesthetic solutions. Alternatively, it may be that obese patients have more fat in the epidural space which reduces the volume of cerebrospinal fluid.

In conclusion, obesity is yet another factor which may influence the height of block in spinal anaesthesia and in all patients who appear obese a high block should be anticipated so that the problems of hypotension and respiratory embarrassment can be speedily treated.

Table 1 Correlation between factors listed below and extent of spinal analgesia.

All patients	
Age	-0.35
Height	-0.10
Weight	0.51**
Weight/height	0.58**
Weight/height ²	0.61**
48 degrees of freedom	**p 0.01
Patients aged 60 to 80 years	
Weight/height ²	0.65**
34 degrees of freedom	**p 0.01

Reference

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ANAESTHESIA IN CHINA

I was fortunate to be invited to join a delegation from the International Association for the Study of Pain, which visited China in the Spring of this year. We visited hospitals, clinics, academic institutes and, of course, many historical sights during an unforgettable three weeks. In order to fully appreciate China as it is today, one must put it in historical and political context. Until 1911, China was ruled by an Emperor and was virtually unchanged from the middle ages. Between 1911 and 1949, the country was torn by war and civil war. Since Mao Tse-Tung proclaimed Peoples' Republic of China in 1949, there have been two enormous upheavals, the Great Leap Forward which started in 1958 and in which it is estimated that 16 million people died and the Cultural Revolution which started in 1966, and went on until Mao's death in 1976. Chinese medicine has hardly had a chance to develop in such stormy times, however, there have been great achievements and the average life expectancy has improved from 35 years in 1949 to 61 years in 1981.

We were able to visit hospitals in four cities and observe anaesthesia during surgery. The techniques varied from place to place and it seemed that there was little communication between different centres. Regional anaesthesia is widely used and we estimated that 55% of operations were performed under regional anaesthesia, about 45% under general anaesthesia and perhaps 5% under acupuncture. Spinal and epidural

Dr W. A. MACRAE

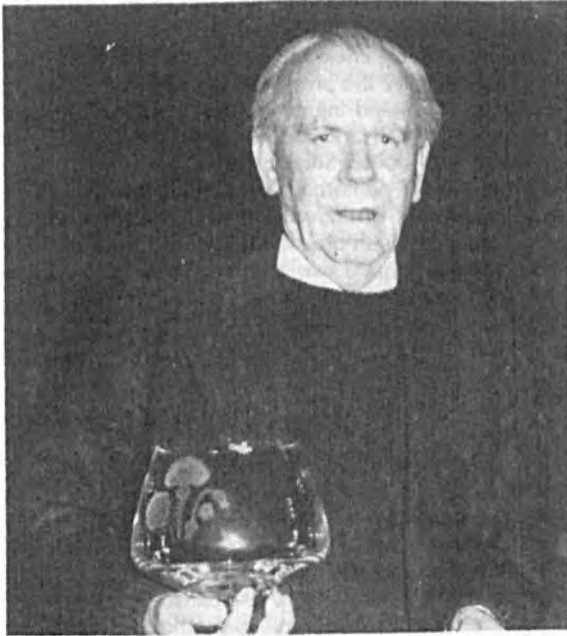
anaesthesia are widely used for abdominal and pelvic operations, including obstetrics, as well as in orthopaedic procedures in the lower part of the body. Cervical epidural is also used for the re-implantation of severed limbs. Brachial plexus anaesthesia is widely practised. The local anaesthetic drugs most commonly used are lignocaine and tetracaine, although hospitals also use procaine.

General anaesthesia varied widely from centre to centre. Pre-medication was usually with a barbiturate and atropine was also commonly given. Thiopentone was almost universally used as the induction agent, but maintenance of anaesthesia was sometimes achieved with nitrous oxide, oxygen and a volatile agent, but more commonly by an intravenous infusion. A typical mixture for continuous infusion would be thiopentone 2%, suxamethonium 1% and procaine 0.05%. Ventilation was usually by hand. The choice of drugs was often dictated by availability and we were surprised to hear that enflurane was used, because it was available and that drugs such as trilene were not available.

The most memorable part of our visit, was witnessing operations under acupuncture. While the Chinese admit that this technique is not suitable for all patients, there is no doubt that for selected patients, it is effective.



GILLIES MEMORIAL LECTURE—Dr H. W. C. GRIFFITHS “CLINICAL ANAESTHESIA, RETROSPECTIVE AND PROSPECTIVE”



I qualified in medicine in Calcutta in 1941. Immediately I was posted to the Punjab where without experience of any kind I was transformed overnight into an anaesthetist at the local British Military Hospital. In time I was handed my anaesthetic equipment which consisted of cans of ether, a small wire cage, a pair of vicious mouth gags and a wedge of wood, and told to get on with the job.

My recollections of the months which followed are somewhat vague, probably due to benevolent amnesia. It was fortunate that the scope of surgery was limited and the patients were the flower of our youth.

In time I learned to render patients unconscious with the open ether technique; this involved considerable physical and mental energy, the manual maintaining of an airway alone involving so much effort that little time was left to consider other factors—physiological—patient management—surgical operating conditions—these thoughts never entered my weary head. The patient was asleep, the rest was up to him.

A short time later early in 1941 the vagaries of war, in the form of German U boats, determined that this small hospital because of its pleasant situation and climate, should become the general surgical centre for British troops for India. A specialist staff arrived, surgical, ear, nose and throat, and even an obstetrician for these were busy days, but, alas, no anaesthetist. I received a

letter from G.H.Q. informing me that my salary would be raised 100 rupees a month—I was acting official anaesthetist to the new unit. Stirred by this generous gesture and the unpleasant sinking feeling in my midriff I realised I had to do something about it. I cannot now recollect how news reached me of a wonderful new invention, a rubber tube which when pushed through the nose entered the trachea and relieved the anaesthetist of the drudgery of hanging on to his jaw. This was great news. I obtained one but soon realised that considerable skill was required to persuade it to enter the trachea—with this difficulty was born the realisation that *technical skill* was an important aspect of my new calling. With diligent practice and an unending flow of soldiers for tonsillectomy I mastered the technique—or nearly mastered it. Life became easier. It is true that the periods of induction grew longer and sometimes bloodier, but once the tube was in what a relief, what a pride of achievement. For a time every patient whether the operation was on his toe nail or his tonsil was duly intubated.

At this time with a full specialist staff, the character of the surgery began to change. Haemorrhoidectomy and menisectomy were on the end of the list instead of being the list. Strange operations such as choledochotomy, gastrectomy, partial colectomy, had displaced them and it soon became apparent to the surgeon and myself that a change of method was imperative. The surgeon, a man of great understanding, gently suggested that I might like to try spinal analgesia for major abdominal surgery. With the aid of the instructions in a box of Stovaine ampules, and kindly encouraged by my colleague the first few operations under spinal analgesia were carried out. We started at the lower end of the perineum, the foot, the knee—this was fortunate for at this time I had no real understanding of the cardio respiratory effects of spinal analgesia. Soon intubation and etherisation were abandoned except for those few operations above the diaphragm, mostly ear, nose and throat.

We had our troubles—nausea and vomiting, circulatory collapse, restlessness and occasionally air hunger *but* in spite of this it was evident that it offered incomparably better operating conditions than open ether, certainly as I knew it. For me its use sparked off the first understanding that more than technical skill was required. The profound physiological derangement was the price paid for good operating conditions. I lived through many months of acute anxiety, what would happen next? I am ashamed to say that I nearly packed it all in, I probably would have if opportunity had arisen, fortunately it did not and things slowly improved. I used light nupercaine instead of stovaine.

adopted the Trendelenburg position for all cases and administered oxygen through a glass funnel; the alarming incidents became less frequent. I had now been giving anaesthetics for about a year and had achieved some degree of competence in etherisation by the open mask method, in nasal intubation and spinal analgesia. I could manage most operations on the body surface, in the mouth, the limbs, and the abdominal viscera. The cranium and the chest were still closed cavities and in the two years that I worked in this hospital they were never opened. Transfusion of blood was never carried out and control of infection was tenuous. During this time I was also medical officer in charge of acute surgical wards and watched many young men die and although I was unable to help them I became familiar with some of the pathways of death. From this experience stems my belief that the person who looks after the patient during surgery should do so for several hours after its completion.

In retrospect I realise how fortunate it was that most of the patients during this period were fit young adults. The aged, the very young, the respiratory cardiac and endocrine cripples were not among my clientele.

It was now late 1941 and reinforcements were arriving from the U.K. A Consultant in anaesthetics arrived at the hospital and it was my first real contact with modern anaesthesia. Unfortunately I was unable to benefit from it for I was posted across the Indian Continent to the Eastern Army which was forming to face the threat from Japan.

The next two years saw the rise and fall of Japanese imperialism. For me they were years of great opportunity. I met, I saw, I heard, and learned many things. I met for the first time as an anaesthetist, malnutrition, tropical disease, anaemia, severe infection. I met the more direct results of war, acute multiple injuries. I had the whole shock problem on my doorstep, presented en masse. Haemorrhage, trauma, dehydration, infection, both aerobic and anaerobic, burns, pain and fear. I met an inhospitable environment, heat, humidity and hyperpyrexia. I met men of many races, from black, less black, yellow and white; there did not appear to be any special difference to their biological response to anaesthesia or injury.

I saw the results of blood transfusion, they were impressive. I saw the introduction of antibiotics and with them the great improvement in the shock problem. I saw the M.R.C. Unit working on the problems of anaerobic infections. I saw my first copy of Langton Hewers Recent Advances in Anaesthesia. I saw intravenous anaesthesia used on a large scale in wounded men. I saw and handled Magill's Larynscope reverently. I heard many things from others better trained than myself and names such as McIntosh, Magill, Gillies, Guedel and Harris began to take on meaning.

I learned to appreciate the importance of the physical state of the patient and I learned above all that anaesthesia was not a routine technical procedure. Indeed I first became aware of the inadequacy of the term itself. I learned that procastination was not the best treatment for acute circulatory failure, that a pad over a sucking wound of the chest while an excellent first aid measure did not solve the problem. I learned that the treatment of severe head injuries under condition of war were more likely to produce monsters than men. I learned to use and abuse intravenous anaesthetics, that continuous I.V. pentothal was not the anaesthetic of choice in severely wounded patients. I became reasonably competent with oral intubation but above all I learned that anaesthesia was a subject in its own right and I began to entertain ideas of making a career of it.

By late 1944 the war against Japan in Burma was all but over, I was posted back to India, first to an excellent course run by Victor Goldman. At the time I felt that this of course, would have been more beneficial had I received it earlier but the army does crazy things occasionally. On this course I used controlled respiration for the first time, using ether as a central depressing drug. I saw a bottle of trichloroethylene, a bottle of vinesthene and a cylinder of cyclopropane for the first time. I bought a Wright's Physiology and was informed that anaesthetists were eligible to command mobile surgical units. On completion of the course I was sent to a fine military cantonment, the depot of several famous Gurkha regiments. There I took up fishing, mahseer were plentiful and some of them ran to over sixty pounds in weight. Again I was fortunate; a surgeon in the hospital was an ex-missionary and an expert in local anaesthesia. He taught me many local techniques, brachial block, caudal block, abdominal field block, etc. We dabbled in intravenous analgesia both local and systemic and local haematoma infiltration for the reduction of closed fractures. One of my regrets has been the disappearance of local in modern anaesthetic practice. I believe that in Britain with its excellent hospital service, this trend is justified, but it was fun while it lasted.

War in Europe was over, Japan was on her knees and thoughts were turning to the future. India had been promised independence and it was time to leave.

I arrived in Greenock on a cold February morning in 1946, determined to take up anaesthesia as a career. During a short spell of leave in London I heard Gray and Holton's lecture at the Royal Society of Medicine "A Milestone in Anaesthesia." It fired the imagination. I was determined to gain entrance to an academic centre to catch up with and benefit from the great advances which had been made in this country, and perhaps utilise some of the experience acquired in a less academic environment. I wrote to John Gillies in Edinburgh and I was accepted. A debt to him and Edinburgh which I can never repay.

The introduction of curare into anaesthesia was truly a milestone for it changed one's attitude and it opened the door to the possibility of physiological trespass. The term had not yet been coined but the first barrier was down, if the mechanics of breathing could be safely controlled why not the circulation or even metabolism? It cradled these wild ideas; its introduction destroyed once and for all the spurious concept of "physiological anaesthesia." Its rapid reversal with Prostigmin was the nearest thing to pharmacological control yet achieved. The by-products, a better understanding of the mechanics of breathing and the biochemical consequence of its derangement. How many of us would have heard the term lung compliance and understood its meaning. This new knowledge was embodied in the clinical management of respiratory dysfunction, the development of efficient ventilators and equipment to measure many parameters. Would all this have happened if controlled respiration had not become a daily task?

The introduction of the National Health Service in 1948 ensured the future, encouraged a better type of student to enter the specialty, led to higher academic standards; and by destroying the bondage of anaesthetists to surgery quickened the tempo of advance. Richard Gordon's column in *Punch* cartooned this with devilish humour. The development of controlled hypotension in the years that followed was important because it stimulated an interest in circulatory physiology. It forced re-examination of current concepts and ultimately led to the accurate measurement of various circulatory parameters which could be analysed. The concept that hypotension per se was extremely harmful had to be modified; it made nonsense of the cliché that anaesthetists contributed nothing to medicine.

At this point I would like to take stock of our position as I saw it in the middle 50s.

1. Safe, competent anaesthesia was available to all. Age, serious systemic disease and time were no longer serious obstacles to surgery. Most parts of the human body could be laid bare, surgical operating conditions were more or less satisfied.

2. Our anaesthetic cabinets were bulging with tools, some of them rusted, others shining in their newness. With them we stripped the human organism of consciousness, sensory and motor function, most reflex responses, vaso motor function and respiration itself. Furthermore this could be done with adequate control and safety. We might well have asked what else was possible or indeed desirable. Were the days of adventure over. To answer this question we had to examine the position of surgery at that time. Some fields were contracting, particularly the control of infection and a good example was the eradication of tuberculosis. There were, however, greater possibilities

just around the corner. I sensed an increased realisation among surgeons that uncontrolled cell mitosis was too subtle for orthodox surgical practice. I felt the days of heroic surgery for cancer were diminishing. Effective surgery would be reserved for emergencies such as intestinal obstruction, perforations of the small bowel, retention of urine and all forms of trauma. However, other fields were opening up, intra cardiac surgery was in its infancy and I felt that if history ran true to form we would have another period of feverish activity. The surgical management of congenital heart disease such as patent ductus, A.S.D., V.S.D., Fallots tetralogy, aortic and pulmonary stenosis would form the bulk of the work. More extensive forms of cardiac surgery would have to wait until an efficient form of cardio pulmonary bypass was developed. At this stage with so many enthusiasts promoting ideas and red herrings in the field, it was difficult to predict which would triumph, deep hypothermia or plain extra corporeal bypass at normal body temperatures. The normal anaesthetic surgical relationship was bound to change. The teams would include physicians, haematologists, pump-ologists, biochemists and their tools. A bewildering array. What would be the place of anaesthetists in such a team. Was he to perform the orthodox duties of anaesthesia alone, to render the patient unconscious and analgesic relaxed and apnoeic, while the others determined the outcome. Was the anaesthetist to become a poor, pathetic figure sitting in his driving seat whilst the gears, the brakes, the accelerator, steering wheel were in other hands, wondering why he had to pay for his driving licence? Could he assume control over the whole process? I believe his position was at the top of the table watching the patient, the monitoring systems and the surgical manipulations. These were things he understood. Information from other parameters particularly biochemical and haematological could be fed to him by the team. He would have to acquire enough knowledge to understand their significance. What qualifications had the anaesthetist to this position? Firstly, the operating theatre was his normal habitat. His training and experience gave him a natural sense of priority. He was accustomed to rapidly changing haemodynamic patterns and their interpretation and management. He had handled many cardiac arrests before and could more readily anticipate their eccentricity. Cardiac arrest, ventricular fibrillation and their treatment and care were well known to him and, finally the surgeon usually knew and trusted him.

NATIONAL MEDICAL CONSULTATIVE COMMITTEE SUB-COMMITTEE FOR ANAESTHETICS

The sub-committee met on 30th May and 7th November, 1984. The main items on the agenda were again mortality associated with anaesthesia, current practice in obstetric anaesthesia and pain therapy. It may be remembered that the sub-committee felt that the impetus of the Association of Anaesthetists' mortality study could best be maintained by a combined exercise with the Specialty Sub-committee for Surgery. The parent body at its meeting on 17th May responded by suggesting that, as the study was a form of medical audit, the appropriate forum through which this could be done was the Scottish Conference of Royal Colleges and Faculties. The report of the working group on obstetric anaesthesia had been submitted to the Planning Council in June and, with the insertion of some minor modifications, is ready for publication. The sub-committee suggested that chairmen of health boards and divisional chairmen

should be included in the distribution list. Pain therapy clinics were also considered by the NMCC when it met in May in response to a study of current practice in Scottish centres which had been initiated by the sub-committee. While generally supporting the establishment of such clinics the parent body did not see it as part of its function to publicise their value; their development should be rather through contacts at local level between the profession and employing authorities. The sub-committee at its November meeting decided that the matter should be kept under review in 1985. There are two changes in the sub-committee. Dr J. I. M. Lawson has retired as chairman and Dr Graham Macnab succeeds him. Dr Sheila Madsen is now a consultant and has been replaced by Dr Geoffrey Bowler as junior staff representative.

J. I. M. LAWSON

STANDING COMMITTEE (SCOTLAND): FACULTY OF ANAESTHETISTS

The Standing Committee has continued to have before it the review of hospital medical staffing in Scotland arising from the "Short" report. A steering committee of the Scottish Home and Health Department and the Scottish Joint Consultants Committee has now been set up to study the implications of the report and, as a first step, a working group was formed to study its possible effects on Anaesthesia. The group decided to look first at the Perth and Kinross hospitals with the agreement of their division of Anaesthesia; this pilot study was initiated by use of a preliminary questionnaire and was followed by a visit by members of the working group. Dundee and Angus have also now been visited and it is likely that the questionnaire will be sent to all Scottish divisions with a number being asked to agree to a visit.

The changed examination system has also been on the agenda. The Standing Committee felt that there might be a case in the future for some devolution in examination arrangements to centres outside London, at any rate for Parts 1 and 2. Such a move would have the advantages of reducing expenses to employing authorities, causing less interference with service commitments and taking some pressure off facilities in London. Concern has continued to be expressed that regional educational advisers in Scotland do not have the opportunity to comment upon consultant job content and the matter may be brought again to the

notice of the Scottish Conference of Colleges and Faculties. The SSC nominees for the National Panel to replace members whose period of appointment had ended were accepted by the SHHD. The Dean suggested that all new members should be invited to meet him for a discussion of faculty guidelines as has been the practice for many years in England and Wales. The Chief Medical Officer had asked for a list of names from which to select referees to serve on the Confidential Enquiry into Maternal Deaths with the result that Drs D. D. Moir and D. B. Scott were reappointed. The meeting of the Scottish REAs and faculty tutors with the Standing Committee in Stirling on 27th June was very successful and well attended. A proposal by Dr Scott that consideration might be given to setting up a mechanism whereby it would be possible for anaesthetists to exchange jobs temporarily between centres and district hospitals as a means of continuing education and exchange of information was considered worthy of further exploration.

An election for the SSC was occasioned by the retirement of Drs Lawson and Moir. Both were eligible for re-election. Dr Moir did not wish to stand again and the Committee is very much in his debt for his valuable contributions and advice during his term of office. Drs W. L. M. Baird and J. I. M. Lawson were elected.

J. I. M. LAWSON

GOLF OUTING

While he was President of the Society last year, Bruce Scott proposed the organisation of an annual golf match. Our Secretary wrote to all the members asking for their views on the matter, and the result was a very successful day at Gleneagles on Tuesday, June 26th. As readers will see from the photographs, the weather was fine and the meeting was a combination of sport and a Symposium!

In the morning, there was a four-ball team event in which the Secretary's team were the victors over the

President's team. In the afternoon, there was an individual stableford competition which was won by Alan McDonald with 37 points. Sandy Forrest and Alastair Masson were second equal with 34 points and Donald Moir carried off the booby prize. Connie Howie won the ladies prize. In the evening, the competitors had dinner at the Dornie House. After such an auspicious start, this will surely become a popular annual event.



SOME NOTES ON THE HISTORY OF THE SCOTTISH SOCIETY OF ANAESTHETISTS

Dr DAVID WRIGHT

The Society was founded in Edinburgh on February 20th, 1914, following a dinner in the Balmoral Hotel, attended by eleven gentlemen practising the speciality of Anaesthetics in Scotland. 1984 thus marked the 70th anniversary of this event and 1985 marks the 35th anniversary of the Society's reconstitution in 1950 and the 25th anniversary of the institution of the Newsletter in 1960.

In 1979, the origins and history of the Society were described in some detail by Dr Lawson Davidson in his Presidential Address to the Society, which was subsequently published in the Society's Newsletter (No. 20, December 1979). A further comprehensive review is not called for therefore, but because of the various anniversaries it seemed reasonable to cast a few backward glances. Amongst the Society's records are the original minute book and account book and several letters from early members to the Secretary of the time. Extracts from these will be used to provide some more details of a few of the interesting personalities and events in the Society's history.

These eleven founding members at the dinner in the Balmoral Hotel (which used to stand in Princes Street, Edinburgh) were Dr Johnston from Aberdeen, Dr Mills from Dundee, Drs D. C. A. McCallum, J. H. Gibbs, M. H. Jones and J. S. Ross from Edinburgh, and Drs Boyd, Fairlie, Lamb and Napier from Glasgow. Drs Ogston and Robertson from Aberdeen and Dr Home Henderson from Glasgow sent their apologies. These last three were, in fact, elected as original members with the other eleven when the first regular meeting of the Society was held in the Guildhall, Edinburgh, on April 18th, 1914.

Dr McCallum was the first President, Dr Boyd Vice-President and Dr Stuart Ross, the first Secretary/Treasurer, with two meetings a year planned for April and October. Because of the First World War, however, during which meetings and subscriptions were suspended, it was another five years before the second regular meeting was held in Glasgow in 1919. In 1914 an arrangement had been made with the American Journal of Surgery, whereby its Quarterly Supplement of Anaesthesia and analgesia would be regarded as the official organ for the publication of the proceedings of the Society. By 1919 it was clear that this arrangement was not working satisfactorily and it was terminated. This publication (see Fig. 1) whose Editor was Francis McMechan, is interesting as it was in existence for some years before the publication in 1922, of Current Researches in Anaesthesia and Analgesia, the first periodical devoted solely to anaesthetists.

From 1919 until 1938 regular meetings of the Society were held and the number of members paying the five shilling subscription rose to 36. Dr Stuart Ross resigned as Secretary in 1924 and Dr Napier succeeded him until 1939. In September 1939 a notice was issued cancelling all meetings and subscriptions for the duration of the Second World War. The accounts book of the Society records a balance on hand on 9th November 1939, of £27:18:3½d. This remained the same until 29/30th April 1950 when the Society was revived at a meeting at Dunblane Hydro Hotel. Much of the arrangement of this meeting was carried out by Dr H. H. Pinkerton of Glasgow. He wrote to the former and prospective members with proposals concerning the resuscitation of the Society. Among the letters he received in reply in April 1950, were two from David Lamb, who had been one of the original members in 1914.

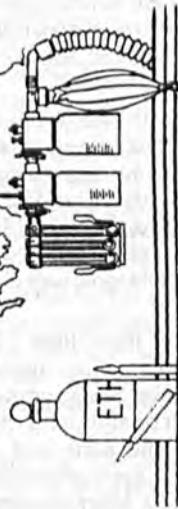
Dr Lamb thanked Dr Pinkerton for his communication regarding the revival of the old Scottish Society of Anaesthetists. He did not know if any other original member survived as "we were all about of an age at the beginning and I am now looking forward to my 80th birthday in September of this year". He continued, "the advances in the speciality of Anaesthetics in your time must have been very interesting, but not more so than in ours.

We had to fight against the belief and teaching of Sir W. MacEwen and all other Scottish Surgeons that Chloroform was the one and only anaesthetic even though the death rate "on the table" was very high (an average of about 50 annually in the Glasgow Royal Infirmary) at that time. The vested interests of the general practitioners for whom the fee for the administration of chloroform was a valued perquisite had also to be overcome. Comparatively soon, however, the surgeons, and later the general practitioners realised the value of the services of the "specialist" Anaesthetists and our position improved and we ceased to be looked upon as just senior "housemen."

We went through all the stages of the introduction (to Scotland) of mixtures of Chloroform and Ether, Ether with a Clover's Inhaler (later preceded by Nitrous Oxide or Chloride of Ethyl) open Ether preceded by Atropine injection and occasionally morphia.

Intravenous Ether and Hedonal were short lived. Then came Spinal Anaesthesia usually with Stovaine and many crises due to fall of blood pressure and dread of lowering the patient's head. Next came Boyle with continuous Nitrous Oxide and Oxygen,

NEWS LETTER



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though there was usually a more or less constant bubbling of Chloroform and/or Ether during the administration.

I met Hewitt and several other London Anaesthetists and McCardie of Birmingham who was president of the first "Anaesthetic section" of the BMA meeting in Glasgow—also Magill introducing his blind intubation of the larynx by the tube through the nose where previously we used the direct laryngoscope. I remember also seeing the famous Crile "trying" to demonstrate the resuscitation of a cat six minutes after it had been killed by chloroform. Altogether I look back upon a very interesting and happy time as an Anaesthetist but I have been so long out of touch with Anaesthetists and Anaesthetics, that I cannot look forward to membership (even as a non-playing member) of the resuscitated Scottish Society of Anaesthetists."

In a second letter, a week or so later he thanked Dr Pinkerton for "your sympathetic reception of my random reminiscences" and went on to describe a few more "rambling memories."

"Present day Anaesthesia is definitely much better than in my day. The better premedication is much more humane as well as much more helpful and must greatly lessen the horrors of operation. I used to wonder at and admire the courage of all classes of patients, walking or being carried calmly into the theatre to face the unknown. Nowadays most patients really know nothing about the operation, there seem to be far fewer cases of difficulty with abdominal rigidity and from my limited experience in recent years, much less after-sickness.

I wonder if Anesthetists are still blamed for all cases of post-operative pneumonia and other untoward happenings. Your very kind suggestion of my being elected an Honorary (non-playing) member of the Society would be a great honour but one I must leave entirely in your hands."

Dr Pinkerton himself was unable to attend the meeting, which he had helped to organise, on April 29th/30th, 1950, but he was elected Vice-President of the Society. Dr John Gillies, President elect since 1939, was elected President for 1950-51. Seventy-two new members were elected to the Society and Dr R. N. Sinclair of Glasgow was elected Secretary/Treasurer.

By 1960 there were more than 150 members. As part of a further drive for more members, the current Secretary, Dr Malcolm Shaw, wrote to all specialist anaesthetists in Scotland who had not already joined, publicising the aims and activities of the Society and inviting applications for membership. He sent out with this letter the first edition of the Newsletter (Fig. 2). The Newsletter thus came into being as an aid to recruitment as well as a record, for existing members, of past events and a notice of future plans.

For this first issue Dr Shaw invited Dr J. Ross McKenzie, a former President and member of the Society since 1920, to write an article. This, entitled "A Milestone in the History of the Scottish Society of Anaesthetists," contained reminiscences in the manner of Dr Lamb's letters.

He recalled the "founders and pillars of the Society," "Stuart Ross was a robust man, an administrator and the author of an excellent book on Practical Anaesthetics. Fairlie was a man of refined character, with great ability and vision. He was the perfect anaesthetist and had the complete confidence of the Surgeons of Glasgow. Torrance Thomson as the Scientific anaesthetist and observer. He was a philosopher and appeared to scorn the mundane things of ordinary life. Napier was the genial, cynical, highly efficient Secretary, who took notes, and with a grin, confronted you with them, when you were least expecting them. Many a happy hour did I spend with them, both at work and at play. "Dr Ross McKenzie described amongst other things the visit of a number of American and Canadian anaesthetists to Britain in 1926 and his own visit to North America in 1929.

He discussed situations in his practice in Aberdeen which required considerable diplomacy in handling.

"On occasion I was reminded that the anaesthetist had no patients and that any suggestions I made regarding pre-anaesthetic or post-anaesthetic treatment of the surgical patient would require to be sanctioned by the surgeon in charge and might be completely vetoed by him. But the supreme aim and object of the anaesthetist being solely, the benefit of the surgical patient, he was destined to win. It was a long, hard and humiliating road, but today, the wise surgeon is ready to hand over to the competent anaesthetist all the various responsibilities connected with the anaesthetic."

He ended with a plea for research. "Every anaesthetist attached to a teaching hospital should endeavour to have some piece of research or investigation work on hand. He owes this to himself, to his specialty, to his Alma Mater and to his hospitals. In this way he will add his quota to the standard of anaesthesia and so to the status of the anaesthetist. I know well that anaesthetists are busy people with little opportunity for relaxation. But, I still quote to myself, Dr Faust's advice to his students:

"To make time for yourself, begin

By order, method, discipline"

Dr Lamb's reminiscences and Dr Ross McKenzie's thoughts span from Clover's inhaler to modern attitudes towards research. They are linked by a respect for the past, by a sense of pride in one's achievements and by a constant search for excellence. For us they may act as a reminder of our heritage and as an encouragement to greater things. We would do well to establish an archive of similar writings and other records of our present senior members to inspire future generations.

INVERNESS AND THE HIGHLAND REGION

Dr J. A. BOLSTER

There have been great changes in method, availability of new products and staff in the forty years since I went to Inverness. When I arrived in January, 1945, there were two main hospitals, Raigmore and the Royal Northern Infirmary.

At Raigmore there was one full time anaesthetist and at the Infirmary two part time General Practitioners who combined anaesthetics with their General Practice along with one married lady doctor who worked on a sessional basis. My appointment was initially as full time anaesthetist at Raigmore. The scope of the work included gynaecology, general surgery, orthopaedic surgery and E.N.T. which was done by two R.A.F. specialists. There was a full time general surgeon at Raigmore, and two part time general surgeons who worked mainly at the Infirmary. A part time gynaecologist was replaced in 1947 by two gynaecologists who had regional appointments.

Raigmore was the orthopaedic centre for the whole of the Highland Region. This was virgin territory as far as Orthopaedics were concerned, and there was a tremendous backlog of cases requiring urgent attention. The result as far as we were concerned was a heavy workload along with our other commitments. Twelve hour lists were not uncommon with a lunch hour break about 4 p.m. We had to cover lists seven days a week, in order to keep pace with the requirements of the other specialties.

For two anaesthetists this was fairly heavy going, as we were, in addition, on call alternate nights for emergencies.

There were two theatres, each with a Boyles machine, and some intratracheal tubes, uncuffed—no laryngoscopes, let alone a sucker or bronchoscope. By dint of some heavy persuasion we were able to acquire a laryngoscope for each theatre. Prior to this, of course, the tubes were all passed "blind." One got quite expert at this method but it was a far cry from acceptable procedure. There were no muscle relaxants. Muscular relaxation was only achieved by a deep anaesthesia, which prolonged recovery time. In order to counteract this effect I started doing bilateral lower intercostal blocks for upper abdominal cases. This gave satisfactory relaxation with a much lighter general anaesthesia and markedly shortened the recovery period. This method was fairly time consuming and a long list was made much longer. The advent of Curare was greeted with considerable thankfulness.

At Raigmore in 1945 we had both civilian and service patients. Among the service patients were a number of Poles who spoke no English. There was a Polish interpreter attached to the hospital who was very useful if somewhat long-winded. I remember an occasion going to examine a Polish patient with him. "Has he got a pain?" An animated conversation for five minutes

between the Poles then, "He say no." Back to square one.

In January, 1947, I went part time, visiting at Raigmore, the Infirmary and Rosedene, the maternity hospital. By that time Raigmore was a purely civilian hospital. My good friend and colleague, Dr Mary Martin, left to return to Aberdeen to get married. She was a great loss to the anaesthetic set-up in Inverness.

About this time Alec Crampton-Smith came to see me. He had been demobbed from the Navy and wanted to pursue a career in anaesthetics. His arrival was an absolute godsend, and though I could not persuade the Governors at the Infirmary to agree to his being employed as a resident anaesthetist, he acted in that capacity for six months, working as hard as anyone ever did and completely without pay.

By this time E.N.T. ceased in Raigmore and all of that specialty was done at the Infirmary, as well as general surgery and ophthalmic surgery. Ex-servicemen were returning from the forces and were being placed in various disciplines. I was fortunate enough to have two such people allotted to me as registrars, one at Raigmore and one at the Infirmary. This gave the staff of two registrars, two part-time G.P.s and myself. The registrars were not, unfortunately, interchangeable between the hospitals, and did not become so until after the inception of the N.H.S. This made the provision of emergency cover difficult as the part-time G.P.s were single handed and consequently not available for hospital emergencies.

By 1948 under the N.H.S. all the hospitals in the region came under the authority of the Regional Board. There were G.P. anaesthetists in Fort William, Dingwall, Golspie, Wick, Broadford, Stormoway and Dalburgh. It was thought desirable that all these G.P.s should be brought to Inverness for refresher courses and assessment. This took a fair bit of arranging but eventually, bringing them in two by two for two week courses we achieved this. In later years the situation improved and we were able to appoint to some of these hospitals people who had worked in the department in Inverness up to registrar status.

With the advent of the N.H.S. all the consultants in the different specialties except general surgery were on a regional basis, and as the only consultant anaesthetist in the region this had its complications, as one could be called to any of the hospitals for emergencies or difficult cases. I still remember being called to Portree one evening with one of the obstetricians. We drove through the night in an open car, had a puncture outside Kyle, changed the wheel and caught the special ferry. Three miles out of Portree we had another puncture and had to abandon the car. We walked the last three miles in a snow storm, he festooned with drums of instruments and sterile dressings, me carrying

a Gilles closed circuit machine, oxygen, CO₂ and cyclopropane cylinders. We made it. I got back in time to have a bath, shave and breakfast, and start a 9 a.m. list. This experience was not unique. On another occasion we, the same two, had to go to Wester Ross on an errand of mercy. The G.P. had informed us that the patient was bleeding badly, he thought it was a placenta previa and to bring plenty of blood. When we arrived in the early hours of the morning at the patient's house all was in darkness. The G.P. was sound asleep in his own house, and when roused, informed us that the lady had been safely delivered about three quarters of an hour after he had phoned. He reckoned we would be on our way, so he just went to bed.

Despite repeated efforts I was quite unable to persuade the administration of the necessity of at least a second consultant. Instead an additional post of S.H.M.O. was made. One of the part-time G.P.s did a surgical list a week at the Infirmary, and the other did one at Raigmore. As the specialty was rapidly expanding staff were difficult to come by and we were frequently down to the S.H.M.O. and myself, which involved a three list a day routine, owing to the number of lists to be covered by the two of us. We would start one list at 8 a.m. going on to approximately 1.30 p.m., when we would have a quick meal—starting the second list at 2 p.m. to approximately 6.30. Again a quick meal then starting the final list of the day at 7 p.m. and going on until it finished at 10 or 11 p.m. By this time a number of emergencies had collected and had to be dealt with by the anaesthetist on call, who was on alternate nights.

This did not leave much time for meetings, but one or other of us usually managed to attend the Scottish Society meeting in April.

Time for any sort of clinical research was limited, though we did experiment with refrigeration anaesthesia. This very time consuming method, though it had certain advantages, was in our opinion negated by the incidence of chest complications. Having a considerable number of bilateral arthroplasties it was interesting to compare the results of general anaesthesia for one hip, and a unilateral spinal for the second. From our observations and the patient's reactions it seemed that the latter was the method of choice. Before the introduction of blood pressure reducing drugs we used, not without some trepidation, total spinals.

Once the N.H.S. was fairly established there was a little more money for equipment and we were able to equip the hospitals with closed circuit machines, suction apparatus, bronchoscopes and in due course, respirators. As the work load increased so did the staff, not always commensurately. Eventually we were fortunate to have a second consultant appointed in the person of Alan Booth, and a year or two later, a third consultant, Jimmy Muir. About this time, or slightly later we were able to establish an intensive care unit which constituted a great advance in patient care.

Looking back at the anaesthetic services in the Highland Region, from their pretty shaky origins forty years ago to the present day, I am confident that, with the present highly trained and expert staff the service they now provide is second to none.

EDINBURGH—Dr FRANK HOLMES

Your Editor kindly asked me to give my personal view of the development and progress of anaesthesia in Edinburgh since the early days of the National Health Service. The beginning of the health service is a good starting point for such a review because I believe that it spelled the beginning of anaesthesia as a specialty, as we understand the term now. However, in order to give the younger readers a more balanced picture, I should like to begin my story a few years earlier.

In the nineteen thirties there were anaesthetists but their number was inadequately small and their chance of improving their effectiveness in and influence on surgical practice and, therefore their personal status, was poor. For this reason few able young doctors could be persuaded that prospects would improve and that anaesthesia could become a worthwhile specialty. The anaesthetist was still a figure of fun; there was no serious attempt at training the beginner; the current mode of instruction was at best for the blind to lead the blind and more likely, as in my case, one was thrown in at the deep end. Success was measured in terms of avoiding

the patient's death on the operating table or soon after and, if the surgeon was able to get his hand inside the abdomen and retrieve it intact, one's reputation as an anaesthetist was made. Mine was made by discovering early in my career the merits of spinal analgesia for abdominal surgery, coupled with appreciating the physiological and technical reasons for its potential dangers and avoiding them. Other regional analgesic techniques helped to bridge the gap in cases of doubt. In those days postoperative care was entirely in the hands of the surgeon whose interest and diagnostic acumen in regard to impaired physiological function was often even less than that of the anaesthetist, yet suggestions were not usually welcomed or seriously considered. Those observations will suffice to illustrate (perhaps with a small element of exaggeration) the state of anaesthesia before the war and to show that the stage was set for an upsurge of the then embryonic specialty as soon as conditions became conducive to it.

For the anaesthetist, war service pointed the way

towards what was to follow, in so far as the services accepted that, whatever the speciality, all specialists command equal rank, pay and status. War service presented many of us for the first time with the opportunity to observe regularly and learn to diagnose promptly the clinical features of haemorrhagic shock and acquire a practical knowledge of its treatment in all its differing degrees. We soon learned the danger of massive and too rapid venous infusion in the exsanguinated patient (irreversible shock). Thus we breached for the first time the narrow confines of anaesthetic practice as it was understood in the thirties. Those of us, like myself, who served with a maxillo-facial unit had the opportunity to become proficient in tracheal intubation (sometimes in conditions in which the larynx was no longer present or could not be visualised) to a degree which would have taken years to acquire in civilian practice. Tracheostomy or laryngostomy not infrequently came within the realm of the anaesthetist in an emergency.

Thus war service conditioned us to aim our sights somewhat higher than we might have been encouraged to do otherwise but I have no doubt that the inception of the health service in 1948 gave us the opportunity to put our aspirations into practice and, in time, widen them further.

In 1946 a University-linked department of anaesthetics was established at the Edinburgh Royal Infirmary with Dr John Gillies as head. Funds were made available to employ a skeleton staff, pending the final start of the health service. Experienced anaesthetists, returning from the services and thought likely candidates for consultant status within the Royal Infirmary and other Edinburgh hospitals, were given "bridging" appointments with future staffing in mind. Initially, the department was only intended to provide an anaesthetic service for the Royal Infirmary but, as the number of staff increased, other Edinburgh hospitals were staffed from the department and this provided the opportunity to establish a rotating training programme for registrars. Although anaesthetic staffing was the chief function of the department, investigative work was encouraged from the start. Clinical teaching was augmented by a programme of lectures which were orientated towards the requirements of the diploma examinations and by discussion groups which aimed beyond the limits of formal teaching by encouraging independent thought and by pointing towards extending the sphere of usefulness of anaesthetists into more general medical areas for which their training and daily practice particularly fitted them. It appeared that the department was active and progressive enough to attract a sufficient number of young doctors who were anxious and able to make the best of the opportunity which could be offered them.

In due course I must mention some of the more important contributions made by members of the

Edinburgh school during the 30 years following the establishment of the health service. I will restrict myself to those contributions which were clinically orientated and which I believe have stood the test of time and continue to contribute to improved surgical practice, including improved operative success, or, more generally, to an improvement in patient care. I do not intend to give a list of publications (over 300 were produced by members of the department between 1948 and 1978), nor do I intend to list individual names associated with them. This would not only make tedious reading but would also fail to present a true picture of the work of the department as a whole. The success and progress of a speciality is not solely based on published work but on the collective work of all its active members. Certainly in Edinburgh, some anaesthetists have written little but have nevertheless made substantial, or even vital contributions. Scientific orientation increasingly dominated investigative and exploratory work in anaesthesia during the post-war years and this was undoubtedly the key stone in the advances which we were able to make but we must not forget that our speciality is primarily a clinical one and, therefore, its success has depended in the past, and I believe will depend in future, on co-operation, based on mutual trust and respect, between those with a bent for scientific investigation and those with shrewd clinical appreciation. We cannot necessarily expect both attributes in one and the same individual. An atmosphere in which one section can feel more important than the other would be a divisive influence which would diminish the potential success of the group. When we consider the volume of publications produced by the department, the unstinting help of an exceedingly efficient and hardworking secretarial staff speaks for itself.

One of the more dramatic contributions to anaesthetic practice in the post-war period was the concept of lowering the blood pressure in order to produce a relatively bloodless operating field. Although the technique remained controversial for a good many years, it was used in a large number of cases and was shown to be safe, provided the criteria of safety (and incipient danger) were properly understood and strictly adhered to. The study and practice of induced hypotension began in 1948, at first by means of subarachnoid and soon after by drug-induced sympathetic blockade. Clinical use went hand in hand with the study of possible metabolic, biochemical and cardio-vascular side-effects. The surgical fields in which induced hypotension proved of particular advantage were surgery of the sympathetic nervous system, microsurgery of the middle ear, major orthopaedic surgery (when the use of a tourniquet was inapplicable) and major pelvic surgery. When the technique was successful, it enhanced the accuracy of the surgical procedure, particularly in the middle ear, and therefore

its success and it avoided the necessity for massive transfusion with its inherent limitations and possible dangers, particularly in major pelvic and orthopaedic work.

Another field in which the Edinburgh school was active was that of obstetrical analgesia and anaesthesia. Perhaps the most important contribution in this respect was the recognition of supine hypotension in late pregnancy and its cause and the hazard it presents in connection with operative delivery, particularly when regional analgesic techniques are employed which make the ultimate extent of sympathetic blockade uncertain. The study of the condition was initially clinical but was followed by a basic investigation of the impairment of venous return and cardiac output which is characteristic of the condition. There were other studies, as for instance of the effects of different anaesthetic and analgesic techniques in common use for operative delivery on neonatal respiration and of the various aspects of extradural analgesia in normal labour and operative delivery. An important contribution was the recognition of adrenocortical insufficiency as a factor to be considered in severe or prolonged post-partum haemorrhage and its treatment.

The anaesthetic hazards of generalised rheumatoid arthritis and particularly the common involvement of the arytenoid joints, were the subject of an extended study and its results probably proved helpful to anaesthetists who worked in units which only occasionally dealt with corrective surgery for this disabling condition or emergency surgery in rheumatoid patients.

Much constructive work was done in the field of patient care, apart from postoperative care in which anaesthetists everywhere have made important contributions. Pride of place must go to the work of the department in the field of respiratory care which began in 1956. This treatment was initially carried out within the surgical and medical units which had admitted the patients but this proved unsatisfactory. Proper 24-hour supervision and monitoring was impossible to maintain and interference in the treatment by surgeons and physicians unavoidable. We lost one or two patients, in our view unnecessarily, and we began to press for our own unit. Needless to say, certain objections were raised by our medical and surgical colleagues but these were overcome and our respiratory care unit opened in 1961. Thereafter 24-hour supervision by a specially trained medical and nursing staff and adequate and meaningful record keeping became a reality and we now had clinical charge of our patients. Proper monitoring equipment and non-portable ventilators (frequently moved ventilators tend to go wrong) and our own biochemist with facilities within the unit gave us the chance to cope successfully with the responsibility which we had accepted. This was a milestone in the treatment of respiratory inadequacy, because I believe that this was the first unit of its type in Scotland and probably one of

the first in this country. The treatment of crushed chest (often with multiple other injuries), of postoperative respiratory inadequacy and tetanus became successful as never before. Artificial ventilation also proved useful in assessing the prognosis of head injuries when the patient was unconscious and there was an overlay of CO₂ narcosis and resuscitation of the unconscious chronic bronchitic became possible, although we soon found that this latter treatment presented certain ethical problems.

One of the more unusual studies to be carried out by an anaesthetist was that of accidental hypothermia and of simple and portable equipment for its treatment.

Apart from contributions to the clinical work of anaesthetists, numerous basic but clinically orientated investigations were undertaken. To name but a few which I consider notable:

Investigation of various clinical effects of a number of drugs used as analgesics, tranquilizers and in conjunction with anaesthesia; comparative study of local analgesic agents.

Effect of posture on regional blood flow (so important in achieving a bloodless operating field).

Impairment of blood gas tensions and pH in pre-operative and postoperative conditions.

Study of the causes and treatment of metabolic acidosis.

Study of cerebral blood flow in various situations occurring in neosurgical practice.

Observations on cardiac valvular function (this probably contributed to the understanding of some of the problems and thus the success of cardiac surgery).

Finally, I want to mention a factor which, in my view, contributed in some measure to making our department "tick" over-direction from the top was successfully avoided. There was guidance, when it was requested or clearly required, but not direction. Doctors are by tradition individualists and this trait has led to many, if not most, of their achievements.

GLASGOW—Dr I. M. CAMPBELL DEWAR

The dawn of the twentieth century did not seem to presage any great change, in Glasgow, in the practice of anaesthesia, or the status of the anaesthetist, from that famous occasion in Edinburgh, on November 4th, 1847, when James Y. Simpson first used chloroform as a general anaesthetic. The choice of the anaesthetic was still in the hands of the most senior surgeon present in theatre and the actual administration in the hands of the most junior doctor in the theatre. The result invariably was chloroform administered by the resident house surgeon, not always with the happiest of results. It is not surprising that the number of "Anaesthetic Deaths" in Glasgow in 1930 was 102.

To comprehend this problem properly we must remember that the medical environment, especially in the Teaching Hospitals, was quite different from what is enjoyed, if that is the correct word, today. There was no such thing as a National Health Service nor a Western Regional Board. Each of three main Teaching Hospitals, The Royal, The Western and The Victoria, in alphabetical order, was a separate, independent entity supported by voluntary contributions. The day-to-day running of the hospital was under a Medical Superintendent who had no control over the clinical opinions, or actions, of the staff. In each surgical unit the senior visiting surgeon was in complete clinical control so if they wished to use chloroform then chloroform it was. The visiting staff were very much part-time as all they received from the hospital by way of payment was a honorarium which might vary from £15 to £100 per year. Very much at the other end of the social scale were the Resident House Surgeons who changed every six months and were constantly on duty as long as they were in the hospital. In the Western, we resident house surgeons received no salary but were provided with board and keep. In the Victoria I was paid the princely sum of £1 13s 4d a month in addition to my board and keep. As the visiting surgeon was so much in clinical control anaesthesia as a speciality was hardly considered as a reasonable proposition. The teaching of anaesthesia was more or less a formality and I am sorry to confess that during my entire undergraduate career I never actually administered an anaesthetic. I had watched many administrations, as a junior student, from the safety of the students' gallery in G. H. Edington's Clinic in the Western Infirmary. In every case the house surgeon was the anaesthetist with a word of advice now and then from Mr Edington who had a very keen sense of smell and knew at once if the anaesthetist had strayed from the paths of chloroform into the wilds of ether. A few words would stop the heresy. It says all that needs to be said about the standard of anaesthesia that it was some time before I realised that so-called artificial respiration was not a necessary concomitant of anaesthesia. The anaesthetic having started all would usually go quite well for about

the first fifteen minutes or so. Adequate relaxation, little bleeding from the depressed circulation, quiet respirations, everything lovely when suddenly a slight air of tension would appear. The anaesthetist's head would be down by the patient's listening for the slightest sound of respiration, the mask would be whipped off, tongue forceps applied and in those days, rhythmic traction would be applied to the tongue. Meanwhile the operation was abandoned and the surgeon and his assistant would watch the anaesthetist. If no sign of respiration followed the rhythmic traction at once, each surgeon would seize an arm, artificial respiration started, one nurse ordered to apply hot and cold cloths to the praecordium and another to fill a syringe with camphor and oil and inject same where she could find room. Generally those measures were effective, breathing recommenced, the surgeons changed gowns and gloves, the nurse who had been trying in vain to draw camphor and oil through a hypodermic needle finally gave it up and all was well. This, of course, was a fairly common complication in haemorrhoidectomy, if the operation was started before the patient had reached an adequate stage of anaesthesia laryngeal spasm was inevitable. A common question from a bewildered patient on post-operative day one would be, "Whit wey doctor are they kind o' operations sae sair on the tongue?"

In September 1927, I started my medical career as a resident house surgeon in Mr Roy Young's Flat in the Western Infirmary. At the start of the second day, which happened to be a day in theatre, Mr Young asked if I had ever administered an anaesthetic. With all the above in mind I very wisely said "No," and Mr George Dalziel, the first assistant surgeon, was told to teach me there and then on the first patient. The apparatus was a Schimmelbusch chloroform mask, basically a piece of towelling stretched over a conical metal frame, a small brown drop bottle of chloroform, a larger blue drop bottle of ether, a gag and, of course, the inevitable pair of tongue forceps. Mr Dalziel then showed me how to put the Schimmelbusch mask over the patient's face, drop the chloroform, drop by drop, and estimate the depth of anaesthesia by listening to the respirations and sticking my finger, probably somewhat tainted by chloroform, into the patient's eye to test if the corneal and conjunctival reflexes were still present. The operation finally finished, the patient apparently alive and well. Mr Dalziel then handed me the bottle of chloroform and left me to anaesthetise the next case and from then on I was the anaesthetist for the vast majority of the operations performed on the flat. This was my very first step in my career as an anaesthetist which lasted without a break for forty-two years till 1969. Within a fortnight I almost regretted my involvement in this speciality. Sister told me that one of my patients, in the male ward, had a very "pink" eye. I hurried to examine him and, sure enough, the eye was more than pink, a bright scarlet would have been a

more accurate description. Further discussion with the patient revealed two more conditions which shook me more than somewhat. The first was that he said he could not see with that eye and secondly he was a First Mate with a Master's Certificate. I immediately rushed to get some more specialised treatment for acute conjunctivitis and also immediately to join the Medical Defence Society. Incidentally the annual subscription in those days was £1. I see that now it is £264. I am glad to say that the patient made a complete recovery and I decided that in future I could get along quite well without the corneal and conjunctival reflex. There was, of course, a visiting anaesthetist—Dr H. P. Fairlie and an excellent anaesthetist who by example and teaching did much to break down the traditional Scottish adherence to chloroform. He had been appointed to the Royal Infirmary in 1910 and to the Western a few years later and was probably the most respected anaesthetist in Scotland, and the author of a best-seller in anaesthesia—"Handbook of Anaesthetics." Dr Fairlie was a very busy man indeed and his visits to Mr Young's flat were confined to two mornings from 9.30 to 11.30. He was very kind to me and a very great help and encouragement in my early and faltering steps. Fortunately I managed to satisfy the surgical requirements of Messrs Young, Dalziel and Gerstenberg, the second surgical assistant.

I was able to get the patients under and thus save time. I never had any trouble during the operations and, strangely enough, all my patients managed to survive my administrations. I was very fortunate not to have any "deaths on the table" as they were called in those days, which were by no means uncommon in the Western where the other equally inexperienced house surgeons were experimenting with this most dangerous drug. One, not far from my flat, had three in forty-eight hours. Mr Young was sufficiently impressed with what he called my "flair" for anaesthesia that he suggested that I should consider specialising in this branch of medicine and also offered, which was more to the point, to employ me in his private practice. However, many years after, in the course of a dinner to his past and present house surgeons, Mr Young said that the only reason for my becoming an anaesthetist was that I very quickly appreciated that it was the only job in theatre where one could just sit and rest while apparently still working.

It is incredible, on looking back, to think that all over Glasgow, and indeed all over Scotland, the lives of unfortunate patients were being left in the care of completely untrained personnel with the most unfortunate results. And, oddly enough, nobody in particular seemed to care. A report to the Procurator Fiscal, a pathologist's examination, "Death from natural causes" and the next patient wheeled in. When the most meticulous care was used in other ways, the emphasis on pre-operative cleanliness for instance, it does seem odd that nobody appeared to notice that this state of affairs was undesirable or could be

improved. The cause was obvious, a combination of lack of training plus the use of a most dangerous drug. If we wish to find out why this combination was allowed for so many years I think we have to go back to November 4th, 1847, when James Simpson first used chloroform as an anaesthetic on the suggestion of a Liverpool chemist, David Waldie. Six days later he reported his findings to the Medico Chirurgical Society of Edinburgh as follows: "To direct the attention of the members to a new agent which I have been using for some time previously," Simpson went on to say: "I am enabled to speak most confidently of its superior anaesthetic properties having tried it on upwards of thirty individuals." Nowadays we are apt to blame the multi-national drug firms for advocating new drugs without due enquiry and indeed they may lose thousands of pounds in the law courts but Simpson apparently was quite happy with thirty cases in six days. Simpson went on to list its numerous advantages such as rapidity, perfume and most important "No special kind of inhaler or instrument is necessary, a hollow-shaped sponge or a pocket handkerchief or a piece of linen or paper held over the nostrils suffices." Simpson himself was an enthusiast, in addition he was a propagandist of outstanding energy and article after article appeared advocating chloroform until chloroform became a popular synonym for anaesthesia and there is still in Scotland a popular myth that Simpson actually invented anaesthesia. The credit for anaesthesia must go over the Atlantic to the U.S.A., whether to Wells, Long, Morton or Jackson is the subject of much debate, but there is no doubt that the first successful anaesthetic was ether administered by Morton in the Massachusetts General Hospital on the 16th of October, 1846. I remember being in the Massachusetts in 1964 in the course of a trip to the U.S.A., with a surgeon, Mr J. P. Galloway, to investigate intensive care units with a view to opening one, along with a Coronary Unit, in the Victoria Infirmary. Dr Dodd, who was in charge of the intensive care unit in the General, offered to show me the original ether inhaler as used by Morton. Naturally I found this most interesting so we set off to interview numerous people and finally ended up in the vaults where a large safe was opened and there, safely ensconced in a box, was the first piece of anaesthetic apparatus. It was a fairly large sphere with a spout on one side and an opening on top to put in the ether. The patient then breathed in from the spout as a sort of "draw-over ether inhaler." I naturally picked it up to have a better look only to hear Dr Dodds exclaim in horror, "For God's sake be careful, don't drop it." I might have gone down to posterity as "the visiting anaesthetist from Glasgow who dropped the original ether inhaler."

In Scotland anaesthesia meant chloroform with Edinburgh the fons et origo but Glasgow followed suite thanks to the teaching of Sir William McEwen, in so many ways a pioneer in surgery, orthopaedics, brain surgery and even in anaesthesia as he was the first to

intubate the larynx, with a flexible brass tube, in 1878. He insisted that all his students must administer twelve anaesthetics but all those twelve had to be chloroform and all the anaesthetics in his theatre were administered by the resident under his direction. In London, with Dr John Snow there was a more scientific approach to the problem of anaesthesia but Edinburgh would have none of it. Syme, one of the foremost surgeons of his day, was very explicit in the *Lancet* of 1855. I quote a few of his obiter dicta—"Here we never ask questions as to the state of the heart, where chloroform is required it is freely given. The more rapidly the chloroform is given the better, we do not stint the quantity. We are guided entirely by respiration, you will never see anyone here with his finger on the pulse. When respiration becomes difficult or ceases, we open the mouth, seize the tongue with forceps and pull it well forward." Not in any way different from what I saw in Mr Edington's clinic seventy years later. But even in Glasgow it was not all gloom and there appeared to be a light at the end of the tunnel. In 1898 the Board of Governors of the Victoria appointed Dr Lamb as an anaesthetist to the Infirmary. It is interesting to see what the Governors had in mind when they suggested this appointment and I should like to quote from their report. "A very large proportion of the work done in the Infirmary, as in all such institutions, is surgical. In most cases anaesthetics, in one form or another, require to be administered to the patients; and for the purpose of ensuring absolute safety in the administration, so far as human skill can go, the Governors have, during the past year, appointed an anaesthetist whose duty it is to examine every patient before he or she undergoes an operation, and to determine whether an anaesthetic should be administered and, if so, what anaesthetic should be used. It is believed that this appointment is the first of its kind in Scotland, but the Governors are satisfied that it is in the right direction and must be for the greater safety of patients who, unfortunately, have to undergo surgical treatment." Dr Lamb was a general practitioner in the district and he must have been a very busy man. I remember being interviewed by Dr Lamb, by that time retired and a member of the Board of Governors, prior to my appointment as a visiting anaesthetist to the Victoria Infirmary in 1928, with three months leave of absence to go to London on a one-man post-graduate course in anaesthesia. A very interesting course indeed to see such famous anaesthetists as Boyle, Shipway, Magill, and it happened to be at the first meeting of the Royal Society of Medicine that I heard Magill give his paper on Endotracheal Anaesthesia on the 28th of November, 1928. I may say that during my three months wandering from one theatre to another I was treated with the greatest courtesy and willing help.

We had five visiting anaesthetists on the staff of the Victoria which, with three surgical units, one gyn. and one E.N.T., was quite adequate for routine theatres. Anaesthetists in some quarters were looked on with

disfavour and when one considers that the Western, with six surgical units, plus gyn., plus E.N.T., could manage with three visiting anaesthetists, it is clear that, to both the administrative mind and the surgical mind, a trained anaesthetist was by no means an essential part of the theatre furniture. In fact this idea persisted till well after 1948. I shall just mention briefly two examples of this. One was a meeting of the Specialist and Consultant Committee with Mr Murray Newton, a surgeon, in the chair. One of the subjects on the agenda was an application from a S.H.M.O. to be upgraded to a Consultant. Mr Newton proposed that the matter be dropped without further discussion as, if he had his way, there would be no consultant anaesthetist at all, in fact they were lucky to be S.H.M.O.s as the specialty of anaesthesia was of little importance. I had to point out to Mr Newton that we were there to see that the 1948 Act was duly implemented as it was passed and not to alter it to suit our own personal likes or dislikes. Some years later a consultant surgeon, in an article in the *Glasgow Medical Journal* on the treatment of acute appendicitis said that "all the anaesthetics had been administered by house surgeons" as he preferred working with house surgeon anaesthetists "as they were more amenable to reason." However, we were quite happy with five visiting anaesthetists to cover all the routine theatres.

But I was concerned at the anaesthetic deaths where urgent operations were being performed on acute cases, anaesthetised by the resident house surgeons. In 1933 there were 4,145 anaesthetics with 6 fatalities, a ratio of 1/700 but of those six fatalities no less than five were in the urgent class with house surgeons anaesthetising. 1934 was even more so with 7 deaths in 5,686 cases and all seven in the urgent class with a ratio of 1/812. During 1934 a resident anaesthetist was appointed to the Victoria, the first such appointment in Glasgow, and in 1935 there was a welcome reduction to 1/1000 but still 4 deaths were in the urgent cases. The resident anaesthetist could not be on constant duty twenty-four hours a day. The answer was clear, have the visiting anaesthetists deal with all emergencies but how was this to be done? Three of the visiting anaesthetists had other commitments in general practice while the others, including myself, were earning a living in private anaesthetic practice. After discussion with the Governors it was agreed that if the honorarium was raised to £400 per annum, from £100, all five anaesthetists would make themselves responsible for every anaesthetic administered in the Victoria. The result more than justified the extra work and honorarium, as in 1936 there were 7,478 anaesthetics with a death rate of 2, the ratio now being 1/3,700. The best year was 1945 when 10,806 anaesthetics were administered with a death rate of 1, the ratio being 1/10,806. We each were on duty twenty-four hours a week and alternate Saturdays and Sundays, and of course extra duties in the holiday period. I think the Victoria was probably the first

hospital, with a department of anaesthesia, to run such a scheme and the results were more than a justification, briefly—to 1935 the ratio was one death in 840 cases, from 1935 to 1947 one death in 3,110 cases. I could not obtain figures for after 1947 but I am sure they would still show the same improvement as even after 1948, and well into the '60s, the consultants still continue to cover emergencies from 9 a.m. to 12 p.m., with a junior in attendance.

My most interesting case occurred in the autumn of 1936. In those days the medical profession did little to popularise medicine, medicine was for the medicals, not for the B.B.C. I had arranged to take two friends to the theatre and, as we were about to leave the house, the phone rang. My wife, who from bitter experience knew what would probably happen, was listening intently and was somewhat surprised to hear me say "Confound your Siamese twins." Actually it was a surgeon, Douglas Macfarlane, we were both on the staff of the Victoria and the Sick Children's Hospital, with a case of Siamese twins just admitted to the Sick Children's. The history was that, somewhere in the backwoods of Ayrshire, a "tattie howker," or as she would be described now, a "part-time agricultural worker, female", had given birth to Siamese twins, with the help of a local G.P. in a bothy. How he managed I have no idea. They were joined by a fairly thick pedicle in the upper abdomen and it seemed obvious that one, at least, had no chance of survival. Douglas Macfarlane thought he might be able to separate the twins with a chance of one survival. So would I help by going to the

Sick Kids at once. At operation it was found that they had only one liver between them, a sort of dumbbell shape with a large part in each abdomen and quite a substantial amount of liver tissue in the pedicle. Of course no immediate blood transfusion in those days, that was one of the benefits of the War, and I had quite a business anaesthetising both little infants at once, only a few hours old. They both survived our efforts but, as had been expected, one died within twelve hours and the other about forty-eight hours later. This was indeed quite a remarkable case but what followed would have been more remarkable nowadays for nothing at all happened. It was never mentioned in the newspapers, nor by the B.B.C., the surgeon, far less the anaesthetist, was never interviewed. The Matron of the Royal Hospital for Sick Children did call a meeting of the nursing staff and reproved them for unprofessional behaviour and letting down the Royal Hospital. It appeared that some nurses had so given way to vulgar curiosity as to slip into the ward to see the Siamese twins although not on duty in that ward.

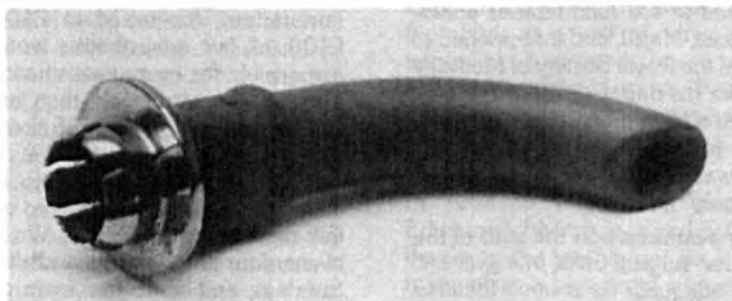
A last word on our much used chloroform. In the late '50s I remember, while visiting Alderney Edge, the I.C.I. research centre, speaking to Raventos, who was responsible for the studies on Halothane, and he surprised me by saying that if chloroform had not been introduced by Simpson and they had discovered it at I.C.I. they would not have put it on the market as the margin between the therapeutic concentration and the fatal concentration was too small.

DEPARTMENT OF ANAESTHESIA, DUNDEE

J. I. M. LAWSON

The first anaesthetics to be administered in Dundee Royal Infirmary were given in 1847 when Dr Munro, on taking charge of the surgical wards in Dundee Royal Infirmary, "resolved to take every opportunity of testing the efficacy of the anaesthetic properties of ether and chloroform." At first only ether was available but soon it was superceded by chloroform. The next anaesthetic event of note was in 1914 when Dr Arthur Mills was appointed. He was a National figure and a founder member of the Scottish Society of Anaesthetists. One of his contributions was

to design an airway (illustrated) for use in head and neck surgery, endotracheal anaesthesia being virtually unknown in Dundee until the late 1940's. In 1945 there were six anaesthetists, all part-time, with emergency anaesthetics being given by the house physician on call, between admitting his own patients. The first whole time anaesthetist was appointed in 1946 when Dr William Shearer took up the post of lecturer in Anaesthetics at the University of St Andrews with responsibility for the Department of Anaesthetics in Dundee Royal Infirmary. He had become a specialist



anaesthetist during war service and had the advantage of having been trained in Oxford by Professor (Sir Robert) Macintosh. He had an M.D. and a D. A. With the introduction of the National Health Service in 1948 and recognition of Anaesthetics as an independent speciality a proper staffing establishment was developed and the commitments of the Department extended. Dr Shearer moved from the university to the post of NHS consultant. The significance of his arrival was not immediately apparent to the staff in D.R.I. and his earlier days must have been a struggle. He was the first whole-timer in the hospital and there was even debate as to whether it was appropriate to invite him to meetings of the staff committee. He was given one room which was to remain 'the Department' until we moved to Ninewells Hospital 28 years later: the University followed up with some additional accommodation in William Low House, but we never had the time or facilities to use it to real advantage.

I came from Liverpool to the Department in 1951, having found myself without an expected post there as the result of a national cut back in junior staff. I was one of two registrars, the other trainees being a senior registrar and three junior registrars (S.H.O.'s). Only Dr Shearer was available for advice on emergencies and he tended to anaesthetise the more unusual cases and, whether on duty or not, junior staff took the opportunity to come along. Anaesthetic techniques were often remarkably sophisticated even by present day standards. Abdominal surgery was carried out under high spinal anaesthesia covered by thiopentone and cyclopropane or, in Dr Shearer's case, by spinal plus nitrous oxide, oxygen and ether and a 'blind' nasal tube. Caudal analgesia in enormous dosage was similarly occasionally used. The 'Liverpool technique' with paralysing doses of relaxant and artificial ventilation of the lungs by bag-squeezing became the standard anaesthetic for abdominal surgery during 1952, the surgeons being willing to exchange greater bleeding for more controllable operating conditions. There was, however, a price to pay—"neostigmine-resistant curarisation" which occurred typically in dilapidated patients with ileus. This complication came as a rude shock to anyone who had been taught to believe that the 'Liverpool technique' was the perfect anaesthetic and the description of it by Andrew Hunter in 1956, followed by a spate of letters to the British Medical Journal, came almost as a relief. Today it seems extraordinary that these patients were not ventilated post-operatively; no doubt we had so much faith in neostigmine that we believed nothing further could be done. There were no ventilators in Dundee at the time and how we first acquired them is a story in itself. In 1952 Dr. Shearer was invited by Dr 'Bill' Jamieson, the now retired Physician-in-charge of King's Cross Fever Hospital, to

accompany him to Denmark. Copenhagen was in the throes of a poliomyelitis epidemic and the purpose of the visit was to see a new technique for the management of respiratory insufficiency. This consisted of tracheostomy and manual artificial ventilation by students working in shifts. The arrangement aroused some criticism, not least because the students expected payment. As a result of their visit a unit was set up in 1953 in King's Cross Hospital in case such an epidemic should befall Dundee, and the health board was persuaded to purchase a number of ventilators, of which the first to arrive was a Blease. Rather than allow them to deteriorate unused it was agreed that until they were required in King's Cross we could have them in the theatres in D.R.I.

The nineteen fifties were in fact a period of great interest and significant development in the speciality. Alongside time-honoured techniques new methods were being introduced; accompanying the gradual spread of high-dose relaxant anaesthesia, hypotension was being used even for operations as routine as simple mastectomy. This enthusiasm had arisen principally from the work on spinals by Griffiths and Gillies published in 1948, and on ganglion blockers by Scurr and Enderby reported in 1951. Dr Griffiths ran an excellent course in Edinburgh in 1954 (fee, 5 guineas) but courses were on the whole few and far between. Instead, it was fairly common practice to visit hospitals elsewhere to see new methods. One of my own expeditions was to Charing Cross Hospital to watch the technique of "artificial hibernation" using a "lytic cocktail" of chlorpromazine, promethazine and pethidine supplemented by thiopentone: Patients were intubated on this mixture and usually were left to breathe air. 'Artificial hibernation' had been introduced by the French in the Indo-China War with the claim that postoperative shock was reduced as a result of automatic depression. We decided to make a serious study of this bizarre anaesthetic in Dundee. Our investigation included the effect of the individual drugs on intravenous adrenaline and nor-adrenaline using patients and patient volunteers (no ethical problems in those days) and some very unpleasant intravenous self-experimentation with chlorpromazine and promethazine, and more pleasant experiences with pethidine. This work culminated in an evening's presentation to the Edinburgh Association of Anaesthetists (as it was then called). The Association had welcomed us as members and the monthly trip to Edinburgh was undoubtedly one of the highlights of anaesthetic life in Dundee during the decade. We considered it well worth the drive which had to be the 80-90 miles via Kincardine Bridge as the Forth crossing in the early evening was too busy to be reliable. By contrast on the return journey we were often the only cars on the ferry (usually the last one). We thoroughly enjoyed these occasions and attendance was excellent, the only accepted excuse for

absence being call. Dr Shearer took a car-load himself on most occasions. He was the opposite of a car enthusiast and his passengers looked forward to their journeys with some apprehension. He had never shaken off the reputation acquired with the first car he had owned after the War. Not least among his adventures was when he proved that it was possible to drive to St Andrews to do a list with a lock which turned only to the left. The one real problem he claimed to have encountered was manoeuvring on the Tay ferry; when he assured an upset looking ferryman that he was all right he was met with the rejoinder: "It's not you I'm worried about—it's the boat!" The journeys to Edinburgh were invaluable for a somewhat isolated Department and at the same time provided much entertainment and many happy memories. Some of us are still members, but with the plethora of meetings available these days and following the founding of the North East of Scotland Society (1960) our visits are now all too infrequent. Opportunities to meet colleagues in those days were limited by the relatively few meetings available and less convenient travelling. The first registrar's meeting of the Scottish Society to be held in Dundee was in October, 1951, where the demonstrations were ligation of patent ductus, use of a portable kymograph to obtain respiratory records in theatre, spread of spinal solutions in a glass spine (Dr Shearer's own manufacture) and, in the afternoon, pneumonectomy for tuberculosis. Hospitality was given to visiting junior staff by Dundee anaesthetists in their homes. The second meeting in 1958 re-enacted a significant fatal accident enquiry in Dundee resulting from our disputing a death described on the death certificate as 'anaesthetic' where the patient had fully recovered consciousness; this event was to lead to the first legal redefinition of 'anaesthetic deaths' in Scotland to which Dr Lawrie of Perth made such a contribution.

The appointment in 1951 of Professor (now Sir Donald) Douglas had involved us in cardiac surgery and the end of the decade saw us progressing towards open-heart procedures. The first patients were operated upon in 1960. The programme got off to a good start after months of preparation using calves and slaughterhouse blood in the cramped quarters of the Department of Surgery; this culminated in a dress rehearsal for which a calf was smuggled into D.R.I. early one Sunday morning. It was soon clear that to ensure continuity of bypass management, we should have to take over the machine (Melrose, Mark 2) and, in order to keep up to date with developments in this field, we established relations with the Brompton Hospital. However, as the years passed, it became evident that we were too small a centre to support open-heart surgery and, regrettably, it was discontinued. The link with the Brompton remains as part of the Dundee programme for GPT and HPT.

We had never ceased to practise spinal anaesthesia and during the early 1960's epidurals followed on naturally and soon became the standard technique for major gynaecological surgery where the intital stimulus had been to reduce bleeding in Wertheim hysterectomies. Towards the end of the decade, interested by the work of Moir and Willcocks, published in the B.M.J. in 1967, a selective obstetric service was introduced, with the first epidural section being performed in March, 1970. The 1960s were marked also by our involvement in dental anaesthesia, although I believe a 'first' had been achieved in 1955, when, despite resistance from the hospital board who did not recognise it as part of their responsibilities, we had agreed to provide a dental anaesthetic service for the local authority school clinics. In 1964, however, there was a new development; methohexitone was now available and, due not least to the activities of the Society for the Advancement of Anaesthesia in Dentistry (SAAD, founded 1957), many dentists were using it. This led to considerable pressure from some sections of their profession for training to be made available and we decided in 1964 to set up short courses in the use of the drug for induction or as a 'single-shot' technique. The decision aroused considerable controversy at the time but has led to a continuing interest in Dundee in dental anaesthesia and sedation. In 1966 we took up feature-card indexing of anaesthetic literature following the work of McClelland and Mapleson in Cardiff. This became an enormous task and culminated in an exhibition at the World Congress in London in 1968. I shall never forget overtaking Dr Shearer driving cautiously down the slow lane of the M1 with his d.i.y. carpentry of our stand sitting precariously on the roof-rack.

Student teaching during Dr Shearer's time was made which was a demonstration of anaesthetic explosions, for which he used his own design of plastic bag and 'sparking plug.' This was often asked for also by other bodies, and I remember his setting off a 'megabag' of cyclopropane and oxygen to entertain a group of visiting surgeons, and covering them with dust. The student lectures culminated in an examination. This was a light-hearted affair from which Dr Shearer obtained much pleasure from deliberately amusing answers. Those who took the exam seriously were in the running for the Duke Stewart memorial prize which had been founded in memory of a pre-NHS Dundee anaesthetist. The prize still exists and is awarded where an undergraduate project completed in the Department is considered worthy of it. Students also had to 'give' twelve anaesthetics which resulted in an annual nightmare before the Final exams when what seemed to be the whole year appeared in the theatres in the course of a few weeks.

Dr Shearer retired in 1972. He had run a very efficient service; always a strict guardian of the public purse he had agreed to increase in staff only when he was

convinced that they were absolutely necessary. If difficulties in covering lists threatened he would find out late in the previous evening the content of each one and redeploy his resources—junior staff soon learned that they were not immune from a phone call in the small hours just because they were off duty. Ever an optimist, he conducted brilliant balancing acts with the rota (which he himself typed and duplicated most professionally) and they always somehow seemed to succeed. One could find oneself with two simultaneous commitments, but they would always be of a nature which, with good will could be honoured: an example might be a short out-patient dental list, which could be interrupted at a few minutes' notice, and cover for the labour room. Night emergencies were looked after by a consultant with often only one other anaesthetist, and there was no possibility of having the following morning free. There was, of course, not such an emergency work-load and those few list patients who had to be returned to theatre were usually managed by the same anaesthetist and not by the on-call staff; this meant that social commitments could be interfered with but, as a colleague recalled, it was 'just what was expected of Medicine.' Illness was not popular in the Department and it was generally regarded as inadvisable to phone in oneself as this could be interpreted as fitness for work. Nevertheless, it would be misleading to give the impression that the Department was unhappy or oppressed. Dr Shearer would leave no stone unturned to facilitate the granting of leave when it was wanted, he himself filling in if necessary. He was dedicated to his work and put his own personal convenience last, and he had a most infectious sense of humour. Relations with surgeons were excellent, anaesthetic equipment was the envy of other centres (no sign of economies here) and clinical standards were high. Although it was inevitably a struggle, some project was always underway and Dr Shearer's own contributions were of the highest quality. A typical example, which has a timeless value, was his deeply researched 'Evaluation of pre-medication,' published in 1960 in the *British Journal of Anaesthesia*; to prepare this paper he spent two weeks at his own expense in London immersed in the library of the Royal Society of Medicine.

Ninewells Hospital opened in 1974. The event gave us an opportunity to proceed with developments which in a few years dwarfed those of the previous twenty-five. Within twelve months the junior staff establishment was virtually doubled; consultant numbers gradually followed suit and there was significant progress in the more academic aspects of departmental life. A secretary was appointed: we no longer had to do most of our own typing, and the hospital telephonists were relieved of their crucial role in departmental organisation which they had carried out so cheerfully and efficiently for as long as anyone could remember. Ninewells (despite representations going back to 1958) had been built without an Intensive Therapy Unit but

we were given temporary accommodation until the permanent area was opened in 1976. The increase in staffing permitted also the introduction of a full obstetric epidural service which had struggled since 1969 on an ad hoc basis with a constantly rising workload. The seeds of Pain Therapy were sown in 1978 by a resourceful senior registrar setting up an acupuncture clinic and it now involves three consultants doing eight sessions. In a department which has always practised regional techniques it is gratifying to find that this has become a major interest.

I have tried to catch something of the atmosphere of what it was like to work in Dundee as the Department developed over the years and I hope that the reader will not find inappropriate the quotation from T. S. Elliot, "The historical sense involves a perception, not only of the pastness of the past, but of its presence."

I am most grateful to Dr Margaret Soutar and to her husband Stanley, for their reminiscences of the early years, for Dr Mills' airway, and for lending me their precious copy of 'The story of the Old Infirmary,' by Dr Henry Gibson, Medical Superintendent at the inception of the national Health Service.

News from the Regions

WESTERN REGION

The Royal Infirmary, Glasgow

UNIVERSITY DEPARTMENT:

Dr Gavin Kenny has been promoted to Senior Lecturer.

Dr J. C. Howie has resigned as Lecturer to take up a Consultant appointment at the Victoria Infirmary, Glasgow.

N.H.S DEPARTMENT AT THE ROYAL

Dr Eric Robertson has been promoted from Senior Registrar to Consultant at the Royal Infirmary.

Dr James Caldwell has been promoted from Registrar to Senior Registrar.

Western Infirmary

Professor A. A. Spence resigned from the Chair of Anaesthesia at the Western Infirmary, Glasgow, to take up the Chair of Anaesthesia in Edinburgh.

Dr Walter Nimmo resigned as Senior Lecturer at the Western Infirmary, Glasgow, to become Professor at Sheffield.

Dr J. M. Asbury has been appointed as Senior Lecturer based at the Western Infirmary.

Dr T. Ireland has resigned as Senior Registrar at the Western Infirmary to take up a Consultant appointment at Paisley Royal Alexandra Infirmary.

Dr David Weatherill has resigned as Senior Registrar to take up a Senior Lecturer appointment at Edinburgh Royal Infirmary.

The following have been appointed as Senior Registrars at the Western Infirmary.

Dr Paul Wilson, Dr Colette Clark, Dr Evelyn Pollock, Dr Tom Algie, Dr J. L. Plenderleith.

Stobhill Hospital

Dr Sheila Madsen resigned as Senior Registrar to become a Consultant at Paisley.

Dr James Stirling retired from Stobhill Hospital.

Dr W. Doherty has been appointed as Consultant at Stobhill Hospital.

Dr Janet Warner has been appointed as Senior Registrar at Stobhill.

Southern General Hospital

Dr David Marsh has been appointed as a Consultant at Southern General.

Social Information

Drs Gavin Kenny and Joan Prentice, members of staff at the Royal Infirmary were married during the course of the year.

The Glasgow and West of Scotland Society now has a President who actually is working in Edinburgh, namely Professor Spence.

Dr David Steel was the winner of the Gallie Salva, which is the golf competition of the Glasgow and West of Scotland Society of Anaesthetists.

HIGHLAND REGION

Two Registrars have joined our department, Dr A. MacNeil and Dr N. Thomas. We hope they enjoy their stay with us.

We have had an enjoyable year testing equipment (often to destruction) for our new hospital. We hope to enter our new premises in April.

Academically we have had another good year. Dr S. Prasad has passed the final and Dr Bobba the primary Fellowship examinations.

Marriage and the primary examination appear to have agreed with Dr Wright who has left us in order to join the Anaesthetic Department in Aberdeen Royal Infirmary. We wish Anthea every success for the future.

Those who read last year's letter may be interested to know that our stock of highland cattle has now increased to seven!

SOUTH EAST REGION

Our new Professor, Alistair Spence, has finally moved to Edinburgh, and we welcome him together with his new Senior Lecturer, Dr David Weatherill, also from Glasgow.

Congratulations are in order for the four newly appointed Consultants from this region—Drs Helena Anderson and David Barker have gone to Dunfermline, Dr Alan Wright to Law Hospital and Dr Colin Sinclair to the Cardiac Unit in the Infirmary. Dr Iain Levack moved to the University Department in October, and our Senior Registrar staff has almost completely changed. This year we have six new appointments—Drs A. Conn, J. Duggan, G. Bowler, I. Armstrong, W. McCulloch and Lauren Allen. Dr Robin Mitchell starts a year as Dr Bruce Scott's research assistant.

Over the year trips abroad have been made by members of the department especially to the World Congress in Manila. Dr Bruce Scott has been to many other places including U.S.A., Finland and Austria. Professor A. Spence spent some of his week-ends filming in the States. There was also a good Edinburgh representation at the Local Analgesia Meeting in Vienna.

The paediatric cardiac service in Riyadh will benefit next year from the visit of Dr Dick Burtles to replace Donald Grubb. This has been a very successful project and it is hoped that links will be retained after this year's final involvement in the development of the unit.

Work on the new Department of Anaesthetics in the Royal Infirmary is now gathering momentum and we hope to move into this very large department before the end of the year.

Dr Allan S. Brown retired this summer from the Department of Surgical Neurology at the Western

General Hospital where he has been the senior consultant since the department opened in 1961. He first became involved with neuro-anaesthesia in 1948 when Professor Dott was based at Bangour General Hospital and the Royal Infirmary. Thirty four years service to one specialty will be hard to emulate. His name is prominent among the literature of neurolept techniques and the treatment of chronic pain. His retirement was memorably marked during the meeting in Edinburgh of the Neuro-anaesthetists Travelling Club as well as a dinner in the Royal College of Surgeons.

Dr Lynda Rutledge has been appointed to a part-time senior registrar post based at the Western General Hospital. With six years of HPT ahead of her, she will rotate through most of the Lothian hospitals.

A regular senior registrar attachment has begun at the Western in place of one of the registrar posts. Dr Lauren Allen, the first in post, has already demonstrated how valuable this change will be.

At Bangour General Hospital there has also been change. Dr Sally Edwards has been appointed to the consultant post vacated, on his retirement, by Dr Henry Turner. The two registrar posts at Bangour have now been absorbed into the Lothian rotation scheme.

TAYSIDE REGION

In 1984, the tenth anniversary of the opening of Ninewells, there were several changes to the Dundee department. Of most significance was the resignation of Dr Ian Lawson from his position as Consultant in Administrative Charge of the anaesthetic services in Dundee. Having carried administrative responsibility since 1972 he has guided the department with skill and tact through its years of growth and expansion to its present mature stability. Having been elected Divisional Chairman for the coming four years, Dr Iain Gray now has administrative responsibility for the clinical service while Dr Lawson continues as Head of the University Department of Anaesthesia. The consultant establishment in Dundee was enhanced in March by the arrival of Dr Tom Houston to whom we extend a warm welcome. In the spring, Dr Bill Macrae was the envy of many when he flew off to China for a three week visit, reports of which provide a fascinating insight into a medical culture totally different from our own.

Our hard working senior registrars are to be reinforced by the creation of an additional, fifth senior registrar post to which Dr Alan Semple had just been appointed. In the same week Dr Tom Goudie has been promoted to a senior registrar post in Glasgow and we give to both our congratulations and best wishes.

Several of our experienced registrars moved on during the year. Dr Russell Lindsay to Manchester, Dr Martin Allan to Glasgow and Dr Duncan Macrae

to London. Dr Chiso Mosieri moved south to join her husband and Dr Nazmy Fares returns to Egypt shortly. We wish them all well for the future.

New registrars appointed were Dr Isobel Smith, Dr Ann David, Dr Margaret Lonsdale and Dr Michael Wee. Joining the department as SHO's are Dr Gillian Hood, Dr Michael Lyew, Dr Lesley Ann Smith, Dr Philip Oates and Dr Michael Serpell.

The planned rotation of junior staff between Dundee and Perth has not yet come into being but a cautious exchange of registrars now being arranged on a trial basis will hopefully break the ice and allow a mutually beneficial rotation of junior staff between district and teaching hospitals as is commonplace in most other areas.

Finally, the department itself had benefitted from some structural alteration under the guidance of Dr Mel Thomson and Dr Bill Macrae. The entrance to the department no longer leads directly into the secretary's room, the senior registrars now have more adequate desk space and a room has been made available to house our recently acquired Olivetti M24 computer currently being programmed to act as a word processor and impartial organiser of the staff rota. Sadly, the provision of windows in the departmental offices remains a forlorn hope and even the promise of paint on the walls is unlikely to relieve the gloom of our perpetual artificial lighting for truly the light is sweet, and a pleasant thing it is for the eyes to behold the sun.

GRAMPIAN REGION

Dr George Duthie, who left Aberdeen in August 1982 to take up a senior registrar post in Leeds, returned in December to be a consultant in Elgin and is warmly welcomed. He replaces Dr John Macdonald who has retired from his specialist anaesthetist appointment. Dr Macdonald's association as an anaesthetist with Dr Gray's hospital extended to 38 years. He has since also retired from his general practice and his plans include salmon fishing, golf and the completion of a historical novel—his fourth with three already published. We wish him well.

Dr Fiona MacLennan received a Research Fellowship from the Association of anaesthetists to investigate the use of nuclear magnetic resonance as a detector of lung water and Dr John Muir left for a year's secondment in his senior registrar post to the Children's Hospital in Halifax, Nova Scotia. Dr Doug McLeod was promoted to senior registrar.

We welcomed Dr Janet Braidwood as a new registrar and Drs Alison Ross, Alison Campbell and Graham Johnstone left S.H.O. posts to become registrars. Dr Brendan Ratcliffe resigned from his registrar post to spend a period in general practice. Drs Alistair Michie and William Mair resigned to take up senior registrar posts in Glasgow.

There has been much change in the S.H.O. ranks. Dr

Dr Alison Dow departed to do general practice and Dr Connie Watt to do paediatrics. Dr Kenneth Lamb took up an appointment as registrar in Glasgow and Dr Arthur Ratcliffe was appointed registrar in Manchester. Dr Anthea Wright was appointed S.H.O. from Inverness and we were also joined by Drs Wendy Dollery, Kathleen Ferguson, Pam Fraser and Gordon Byers.

We saw in 1984 the end of our long running tutorial course for the Primary examination and its replacement, with a measure of reluctance, by a course

which we hope will help candidates for the new Part I examination. The new course is likely to be joined later by one for the Part II examination and the reluctance mentioned sprang from a recollection that enthusiasts for the new examination format had claimed that no formal tutorial courses would be necessary for Part I.

Finally, and against any reasonable expectations it is reported that at least two anaesthetists in Aberdeen have become enthusiastic windsurfers.

AVIEMORE

'84



**NORTH EAST OF SCOTLAND
SOCIETY OF ANAESTHETISTS**

Meetings are held at 8 p.m. in Aberdeen Royal Infirmary, Ninewells Hospital, Dundee, and in Stracathro Hospital, Brechin, unless otherwise notified.

1984

Thursday, 27th September, Stracathro
Dr J. E. Charlton, Newcastle

Thursday, 25th October, Dundee
"Veterinary Anaesthesia: the size of the problem."
Dr B. M. Q. Weaver, Bristol

1985

Thursday, 28th February, Stracathro
Registrars' Papers

Thursday, 28th March, Aberdeen
"Hyperbaric Oxygen and Nervous System Injury."
Dr P. James, Dundee

Thursday, 2nd May, Stracathro
Annual General Meeting and Presidential Address

**GLASGOW AND WEST OF SCOTLAND
SOCIETY OF ANAESTHETISTS**

1984

Friday, October 26th
Joint Meeting with Edinburgh and East of Scotland Society of Anaesthetists to be held in Edinburgh.
Mr Owen Dudley Edwards, Reader in Department of History, University of Edinburgh.
"Sir James Young Simpson and other Prominent 19th Century Edinburgh Doctors."

Wednesday, November 28th
Dr P. W. Thomson, Consultant Anaesthetist, University Hospital of Wales.

1985

Tuesday, January 15th
Member's Night. Hosts—Division of Anaesthesia, Stobhill General Hospital.

Wednesday, February 27th
Dr Derek Doyle, Medical Director, St Columbas Hospice, Edinburgh. "The control of pain in Advanced Cancer."

Thursday, March 14th
Presidential Address. Professor A. A. Spence, Professor of Anaesthesia, University of Edinburgh.

Tuesday, April 23rd
Annual General Meeting

Tuesday, May 21st
Golf Outing.

Unless otherwise stated meetings will be held in the Royal College of Physicians and Surgeons of Glasgow, 242 St Vincent Street, Glasgow.

**EDINBURGH AND EAST OF SCOTLAND
SOCIETY OF ANAESTHETISTS**

Meetings will be held in the Royal College of Surgeons, Nicolson Street, Edinburgh, at 7.30 p.m. for 8 p.m. unless otherwise stated.

1984

Tuesday, September 25th
Dr A. H. B. Masson: Presidential Address
"The Struggle for Recognition."

Friday, October 26th
Combined meeting with the Glasgow and West of Scotland Society of Anaesthetists, to be held in the Lister Lecture Theatre, R.I.E.
Mr Owen Dudley Edwards:
"Sir James Young Simpson and his Medical Contemporaries."

Tuesday, December 4th
Dr P. W. Thompson:
"Hazards of Anaesthetic Apparatus."

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Tuesday, January 8th
Dr A. T. Proudfoot:
"Cardiotoxicity and Acute Poisoning."

Tuesday, February 5th
"Members' Night."

Saturday, February 23rd
Annual Dinner in Teviot Row House, Bristo Square.

Tuesday, April 2nd
Meeting will be held in the Victoria Hospital, Kirkcaldy.
Professor W. S. Nimmo:
"Variation in Drug Response in Anaesthesia."

Tuesday, May 7th
Annual General Meeting.

Further details of meetings, etc. from Dr N. H. Gordon, Department of Anaesthesia, Western General Hospital, Edinburgh. Telephone 031-332 2525, ext.4329.

Registrar's Prize

The Society annually awards a prize of £100 for the best original paper or essay submitted by an anaesthetist in Scotland, holding the grade of Senior Registrar or under. A second prize of £50 or a third of £25 may be awarded for other papers of particular merit at the discretion of the assessors. It is not necessary that the Registrar be a member of the Society.

The conditions attaching to the award are as follows:—

1. The paper or essay must be original, i.e. it should not have been read previously at any meeting or published in any journal. The winning of the prize is in no way a bar to the subsequent publication of the paper in another journal.
2. It is desirable that papers submitted show evidence of personal work, but papers consisting of surveys of the literature are eligible for consideration. The Council of the Society wishes to stress that intending competitors should not be discouraged through fear of their efforts being judged elementary. It is fully realised that junior anaesthetists in some peripheral hospitals may not have opportunities to deal with special types of cases or to employ advanced anaesthetic techniques.
3. Papers for adjudication (4 copies) *must* reach the Secretary by the *end of February* at the latest.
4. The winner of the prize will be required to give a

digest of the paper at the Annual General Meeting of the Society towards the end of April. His expenses for the meeting will be met by the Society.

The Secretary places all entries in the hands of the Award Committee which consists of the President, Vice-President and Past President. The members of this Committee have expressed the desire to be able to adjudicate without knowing the name or hospital of the writer; it is requested therefore that the name, address, etc., of the entrant be submitted on a separate covering page. This will be retained by the Secretary, but otherwise the essay itself should give no indication as to its source: acknowledgement to colleagues etc., should not be included.

The prize for 1984 was won by Dr Colette Clark of the Western Infirmary, Glasgow, for her paper entitled "Epigastric Impedance, a New Method to Measure Gastric Emptying Rate in Man?"

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