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# NEWS LETTER



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## THE SCOTTISH SOCIETY OF ANAESTHETISTS

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# SCOTTISH SOCIETY OF ANAESTHETISTS

## COUNCIL FOR 1987-88

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Past-President.....	Dr A.I. MACKENZIE, Law Hospital
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		Retires
Aberdeen	Dr J.D. McKENZIE	1990
Dundee	Dr I.S. GRANT	1989
Edinburgh	Dr D.G. LITTLEWOOD	1988
	Dr G.M. CARMICHAEL	1990
Glasgow	Dr T.L. FRASER	1989
	Dr B. MAULE	1990
Inverness and North	Dr J.D. MUIR	1989

### PROGRAMME FOR 1988

**Registrar's Prize:** Entries to be submitted to the Secretary by 29th February, 1988

**Annual General Meeting:** Peebles Hotel Hydro, 22nd-24th April 1988

**Registrar's Meeting:** Victoria Infirmary, Glasgow 3rd June, 1988

**Scientific Meeting and Gillies Lecture:** Western General Hospital Edinburgh 18th November, 1988

**Golf Outing:** Buchanan Castle Golf Club, 30th June 1988



## PRESIDENT'S NEWSLETTER



Anaesthesia and its methods of administration never fail to amaze. It seems but yesterday that there was little on the horizon but the steady withdrawal of agents to which we had become accustomed. Suddenly there have appeared a new induction agent, new muscle relaxants, new volatile anaesthetic agents and surface monitors which actually work! Perhaps the pulse oximeter is the best example of this latter category but automatic blood pressure recorders are now commonplace and digital blood pressure monitors are in an advanced state of development. The number of parameters which can be non-invasively measured has increased by leaps and bounds.

Money is short - it will always be short and as it is our own money which funds the National Health Service it should always be short, with spending carefully controlled to obtain the best value. However, the need for patient care and safety for their own sakes, together with the additional stimulus of the rapid and distressing increase in frequency of litigation and size of settlements, requires that we provide for our patients "state of the art" anaesthesia. This includes, as well as the development of our clinical skills the availability of and perhaps even more importantly the use of, appropriate patient monitoring. The Faculty of Anaesthetists, in its "General Professional Training Guide" has provided the necessary encouragement by detailing certain simple monitors which should be available for training purposes and several others which

should be easily obtainable when required. The Association of Anaesthetists is in the process of preparing a document on minimal monitoring which will take us further into the future. Minimal monitoring is a concept which stresses not the minimum you can get away with, but rather the minimum you should accept for patient safety. No longer should patients be rushed into theatre without monitoring equipment attached merely to speed completion of the list. Much can be achieved by careful organisation, with our assistants routinely applying monitoring leads to patients on their arrival in the anaesthetic room but we require to demonstrate to our trainees our own commitment to the practice. If we do not routinely employ monitoring techniques the inference is that we do not consider them to be important.

Money may be scarce, but anaesthetists have a duty to impress upon their Health Boards the vital need for this equipment. As many centres have fallen behind, it may be wise to follow the example of one of the English Regions where a monitoring package has been agreed, sites where anaesthetics are administered are being evaluated as to whether they are all still required, and arrangements have been made to bulk-purchase items of monitoring equipment at attractive discounts. This is truly wise use of funds and should appeal to the canny Scot.

As I write we are awaiting with interest the "Shaw Report" which will have far-reaching effects on the career prospects for our juniors. It is an unenviable task to counsel the ageing "junior" whose career prospects are bleak. Those of us with sons or daughters in the profession will welcome this initiative.

Provided changes are introduced gradually and evenly across the disciplines they can only be to the advantage of us all. To look backwards can be educative, looking forwards should be constructive and exciting and there is certainly a testing time to come until the correct balance is achieved. It is by playing our part in such developments that the specialty will continue to flourish and help to create the environment in which our young folk can work satisfactorily and happily in the years ahead, providing the high level of care for patients we would wish for ourselves.

## EDITORIAL

This edition of the Newsletter sees a new team of office-bearers installed and our thanks are due to Farquar Hamilton, Ian Gray and Bill Macrae for their sterling efforts on behalf of the Society in the past four years. I would like to record my personal thanks to Bill Macrae for his help and guidance to me as his successor, and for the very well organised month by month list of Editorial duties.

The Society goes from strength to strength and the Newsletter will continue to act as a record of the affairs of the Society. The Editor will be pleased to consider articles of interest in addition to the standard features. I would also warmly welcome items of pictorial interest for future issues and I am grateful to Dr. Alan McDonald for augmenting my supply this year. In this context it is worth mentioning there must be a collection of rare/interesting photographs taken by members over the years

at various meetings which however have never been published. The Council has agreed that if members are willing to part with them, the Society would be happy to receive such photographs to form a wider pictorial history of the Society and its members.

On a broader front, the most important "event" of the year affecting Scottish anaesthetists was undoubtedly the publication of the long-awaited Shaw report on staffing. Volume I only is to hand at present, but the initial impression is that it is an honest attempt to eradicate the "registrar bulge" which is a feature of Scottish junior staffing in many specialties. Only time will tell whether the "gap" produced by reducing registrar numbers will be adequately filled by other grades if the report is accepted and implemented. Care will be required to ensure that current standards of patient care are maintained, particularly "out of hours".

### ANNUAL GENERAL MEETING

Once again Peebles Hydro was the venue for the Annual General Meeting which followed the well established pattern of previous years, but on this occasion was blessed with magnificent weather.

On Friday the golfers played in bright sunshine and short sleeves (a change from the blizzards and gales of previous years) and the winner was Neil Morton. The more contemplative sporting types (?) took to the water in search of fish who had obviously been warned however, and once more came out on top by staying below. The trophy was awarded nevertheless to Prof. Campbell for good (? perfect) attendance at this event over the years.

The AGM of the Society took place on Saturday morning, and the Presidential Address, the Guest Lecture and the Registrar's Prize Lecture occupied the afternoon. These are printed elsewhere in the Newsletter and

make interesting reading. The Annual Banquet in the evening went off in sparkling fashion (literally) as the dessert was an edible version of Pinson's Bomb and was carried in lit with sparklers! Despite this the services of the local Fire Brigade were not required. After an amusing speech by the President the company engaged in the customary dancing in lively manner into the wee sma hours.





## MIX 'N MATCH

I am most thrilled to have been elected to this position within the oldest National Society in the world. It was particularly pleasant for me to have been at the same time Vice-president of this Society and of the Association of Anaesthetists of Great Britain and Ireland.

As a former Honorary Secretary of this Society I was fortunate to take over from Professor Donald Campbell - long before he was even a Professor and certainly well before he became Dean of the Faculty of Anaesthetists. Now as Dean of the Faculty of Medicine in Glasgow University it is clear that there is no limit to his capabilities. I was honoured to serve as Honorary Secretary to four Presidents, Jim Crawford, Henry Fairlie both from Glasgow, Norman Rollason from Aberdeen and Frank Holmes from Edinburgh. All had made considerable contributions to the specialty of Anaesthesia and it was a pleasure to serve under them.

Wearing round my neck this elegant chain of office reminds me that as incoming secretary I was instructed to see it was insured, kept safe and as at that time few links on which the names of the Presidents is engraved remained. I was also to arrange for more links to be provided. This posed something of a problem as the addition of extra links to the chain itself would have had the effect of lowering the crest in short Presidents to a level at which it would not appear above the level of the table and might even do them a nasty injury. It was therefore decided to introduce the cross band and it will be interesting in due course to see how the then Secretary copes when the chain is full again. I am sure that he or she will deal with the matter in a most satisfactory manner and I also predict that with a Society which is as healthy and long lived as ours, there will be a need for successors to undertake this task again and again.

Presidential addresses are really designed to fill in the time between lunch and the scientific parts of the afternoon, the registrar's prize paper and the guest lecture. Before preparing my contribution I considered what my forbears in this office have done and found their approaches to have been diverse. Several were philosophical, several scientific and some achieved both aims. Last year, if my reading of the Newsletter is correct, the President tried to spend the afternoon preparing a fowl for the

pot!

For my address today I decided to use the title of Mix 'n Match because I believe that the greatest satisfaction can be derived from a job which has several areas of interest. As a result of pursuing these different avenues of interest I believe the patient receives the best service from the individual. The real problem is to ensure that one of the interests does not begin to predominate over all others to their detriment. To achieve the correct balance is extremely difficult.

I have found solace in three aspects of my work, clinical activities, research and administration, and of these clinical work and administration have been the more predominant. I began my involvement in administrative work in 1966 when, two years after being appointed to a consultant post, I became the Secretary of the newly renamed Edinburgh and East of Scotland Society of Anaesthetists. I found the task daunting. It was therefore with great trepidation that, in 1971, I took on the post of Honorary Secretary of this Society. Taking over from Donald Campbell made it easy in some ways as he had done so much to further the specialty in Scotland, but very difficult in others as he had done it all so efficiently. I was however in post when all the work he had done in preparing the way for the Scottish Standing Committee of the Faculty of Anaesthetists was brought to fruition. It fell to me to run the first election to that body and those of you with long memories may recall that this was not without its problems. However the Scottish Standing Committee has, I know, fulfilled the aims and objects of its instigators and is something of which we can all be proud. I am surprised to find myself once more a member. I found the post of Secretary of the Scottish Society quite arduous and we developed a little cottage industry in our house as, all in a line, with my wife and children we addressed and stuffed envelopes. Nevertheless, meeting and making so many friends around the country amply compensated us for our efforts. Becoming involved in this way in administrative matters has had a great number of other benefits and has taken my wife and myself to many places in the world we would probably otherwise never have visited. I have, through this activity, also become involved in the Committee structure of the World Federation of

Societies of Anaesthesiology and I am impressed with its attempt to improve the speciality throughout the world. I see the roles of these societies and of course of our own Faculty of Anaesthetists in somewhat simple and practical terms. The purpose of this Society and the Scottish Standing Committee is to see that if you are in need of an anaesthetist in Scotland, no matter where you are, there will be one with appropriate training and facilities to look after you. The Faculty in England and that in Ireland together with the Association fulfill this function for the United Kingdom. In Europe the Monospecialist Committee, on which I have the pleasure to serve with Dr. Peter Baskett is striving to create similar standards of training and expertise and the World Federation by its involvement in Third World countries aims to do the same. Obviously these committees have limited powers and can only work within the confines of local support and resources.

It is becoming very fashionable for young men and women to take time off to visit and often to work in an underdeveloped country. This is something which I believe we should support most strongly. At the present time the Association of Anaesthetists, in collaboration with the British Council and the Overseas Development Agency has involvement in such countries as Nepal, Uganda, Zambia and several other of the nations of Southern Africa. I wish to deal for a few minutes with a trip I made for the British Council to Bangladesh a few years ago and try to illustrate some of the difficulties which may be encountered by the unwary and stress the need for very careful assessment of the local situation when visiting an underdeveloped country. I undertook a fact finding visit to see how British anaesthetists could help with the chronic shortage of anaesthetists in Bangladesh.

Bangladesh is the largest, poorest country in the world. The British Council had been asked, at the beginning of 1980, to look at the situation in a large new orthopaedic hospital in Dacca which although provided with surgeons, had very little in the way of anaesthetic support available to it. Furthermore when visiting teams of Canadian and American anaesthetists went to help out for short periods they were unable to persuade the local doctors to maintain any of their initiatives from one year to the next. The hospital had been set up by an

American medical missionary who also happened to be of Indian extraction. This marvellous man had taken orthopaedic surgery out of the hands of the general surgeons and set up an orthopaedic training programme, generating a cadre of orthopaedic surgeons who were - indeed are - moving out to all the regional hospitals and are there rapidly improving the service. However, these are surgeons who are able to practice in hospital and more importantly in private, and are able to generate, by local standards, a good income. In all underdeveloped situations - in a manner similar to our own before the National Health Service - few enter service specialties until most of the major specialties of medicine, surgery and obstetrics are full. Few wish to take up anaesthesia in Bangladesh because the remuneration and status are very poor. Private practice is controlled by the surgical disciplines and payment for private cases is usually done by direct payment of the anaesthetist by the surgeon, often an unsatisfactory arrangement. I found that the country did have a number of trained anaesthetists - usually holding the DA of London and a few with the FFARCS - who were well able to train anyone who wished to be trained. However recruits were few and far between. Being able to travel round the country and to see the situation in the district hospitals made me sure that Bangladesh at this time did not require British anaesthetists whose time would largely be wasted. The need was for the encouragement of local anaesthetists and help with setting up a career structure for their trainees. Meetings with the Minister of Health pointed out these ideas but a lack of political clout by the local members of the anaesthetic specialty made immediate progress unlikely. I hope that the time will come when we can give the help they need but I regret that it is not now.

As you may know I have spent a disproportionate amount of my time in the field of ENT. This was obviously written in my stars as I became involved in ENT at the age of six months when I confounded my worried and non-medical parents with an otitis media. This most unpleasant condition continued to plague me throughout my childhood and into youthful adult life and I spent many a night waiting for the merciful relief which accompanied the bursting of an eardrum - nature's way of solving the problem. This was all before the days of the antibiotics and when they came



they were no great improvement. I well remember, when taking the original M&B waking up one night to find myself literally trying to climb the wall!

I began my anaesthetic career in Leith Hospital and found there was a large ENT component to the work. At the time it was customary to use Guy's Bag which many of the younger members may not have seen. This involved the use of ethyl chloride, surely one of the nastiest agents known to man! However many children were anaesthetised with this agent for the guillotine removal of their tonsils and adenoids.

My next post was in Bristol and again a considerable amount of the work of the SHO was in ENT and it was here, rather than in Edinburgh that I began my relationship with induced hypotension. Over the years induced hypotension has pursued me relentlessly rather than I it and we have had many long and harrowing hours together as I have struggled to develop a technique which aims to take as much of the strain out of producing good operating conditions for middle ear surgery as is possible. My eventual appointment to the consultant ranks in Edinburgh again brought me in close contact with ENT. At that stage I gave up the ghost and accepted the inevitable! I will not spend time on a long description of my anaesthetic technique which is based on stable general anaesthesia with a spontaneously breathing patient, a gentle head up tilt and careful monitoring. To avoid the toxicity which has been described with sodium nitroprusside (SNP) alone I developed a mixture of this agent with arfonad which has been shown to demonstrate synergism and has thereby reduced the need for large doses of SNP, decreasing considerably the dangers of toxicity. When I started this work I employed a mixture containing 125mg arfonad and 12.5mg SNP in 500ml 5% dextrose solution. There was no real reason for choosing this particular mixture except that it used dosages that were comparable with those to which I was accustomed. However, Dr. Cierpka of Switzerland (personal communication), suggested that it would be better to use a 4/1 mixture of these two agents as he had demonstrated in unpublished animal work that maximal synergism was achieved at this level. It is not an easy thing to compare the relative potency of drugs in the hypotensive scene because of the very varied responses met in the intact human

animal. Small facets of the situation - such as the effects of cardiac output or respiration - where the changes seen are relatively large and consistent do lend themselves to small number studies but where changes of whole body physiology are considered the changes are so multifactorial that relatively large numbers of patients must be studied before conclusions can be drawn.

Two factors are mainly involved in resisting the production of induced hypotension. These are the baroreceptor and the renin/angiotensin systems. The body has other mechanisms which it can invoke, such as the ADH response but this is mainly long term.

When studying drug administration methods and requirements the response obtained from giving a drug or a drug combination to an individual patient will be varied by the initial level of sensitivity of the baroreceptor and the renin/angiotensin systems. These will be affected by a number of autonomic and physical factors.

The initial aim with the development of the SNP/arfonad mixture was to reduce the amount of SNP used. There is little doubt that this objective was achieved.

It now became necessary to attempt to see if the drugs which were being used were in the best combination. A group of over 200 patients given the 10/1 mixture was compared with another similar sized group given the 4/1 mixture. From a clinical standpoint no difference could be detected. It is important to stress that the aim with all of these patients was to lower systolic blood pressure to within the range of 55 to 65 mm Hg and drugs were administered until this was achieved. Very few of the patients received beta blockers and when they did the value of pulse rate calculated for the purpose of this study was that obtained before the beta blocker was given. Here I must acknowledge the great help and assistance received from Dr. David Brown of our department with the analysis of the data. When comparing the two groups they were seen to be comparable demographically. A slight difference in the mean of the doses given was detected - the 4/1 mixture requiring less SNP but the difference was not significant. The only significant finding was that the rise in pulse rate which followed hypotension with the 4/1 mixture was less than that obtained when the 10/1 mixture was given. However, displaying graphically the various parameters

measured, other small but interesting features of the information were demonstrated. When considering the dose of SNP used against age, pulse rate rise, pulse rate difference, patient weight and time of operation, on each occasion it was seen that the patients receiving the 4/1 mixture were more closely grouped around the correlation line and therefore their management was probably more predictable. It would seem possible from this data to deduce that the additional arfonad in the 10/1 mixture was not of any value, merely making the pulse rate higher than it need have been. The inference is that the 4/1 mixture of 50mg arfonad with 12.5mg SNP in 500ml dextrose should be used.

This might have been the end of the story had the Committee on Safety of Medicines not cast serious doubts on the safety of halothane. In ENT practice most of the patients have received multiple anaesthetics and have a high incidence of post-operative pyrexia.

It therefore became necessary to develop the technique with another volatile agent. Isoflurane was chosen. As a good Scot it hurt me to vent large amounts of isoflurane through the scavenging system of my machine so it was administered from a circle system with a one and a half litre gas flow. The respiratory pattern of the spontaneously breathing patient with isoflurane, however, differs considerably from that of the patient breathing halothane and when similar respiratory patterns were adopted, carbon dioxide levels rose alarmingly. Some experimentation with a Datex Normac Analyser and repeated blood gas measure-

ments were necessary before the situation was resolved. Since then a study has been made of the 4/1 mixture with isoflurane. There are not yet available enough cases to draw firm conclusions but the results of 60 patients are presented as some interesting findings have emerged. Unfortunately the halothane 4/1 and the isoflurane 4/1 groups are slightly different from a demographic viewpoint. The age in the isoflurane group is higher than that in the halothane group and this does upset the rest of the calculations as age is an important factor in assessing the amount of drugs required. The most interesting finding relates to the measured pulse rates. The anaesthetised patient has a higher pulse rate when breathing isoflurane than when halothane is employed. This in itself is not surprising as it is known that isoflurane has less effect on baroreceptors. However the rise in pulse rate which accompanies induced hypotension in patients receiving isoflurane is considerably less than it is in patients receiving halothane. This does not accord with the view that the baroreceptors are less affected. This is a statistically strong finding in our patients so far. It will be interesting to see if the finding remains consistent as the numbers in the group begin to approach comparability with other groups. It may then be that although the CSM view was not particularly welcome to anaesthetists and will certainly not be particularly welcome to the treasurers round the country, some good may come to patients if the agent does make hypotension easier to induce.

I thank you for your attention.

#### DATA

#### TABLE 1

#### TABLE 2

	HAL/10/1	HAL/4/1	HAL/4/1	ISO/4/1/
AGE	34.67	36.33	36.33	40.18*
WEIGHT	65.07	66.33	66.33	67.17
TIME OF OPERATION	53.24	51.00	51.00	49.08
PULSE - ANAESTHETISED	81.69	79.47	79.47	89.17*
PULSE DURING HYPOTENSION	108.18	99.51*	99.51	97.03
PULSE DIFFERENCE	27.60	21.47*	21.47	8.70*
DOSE - mg/kg	0.11	0.09	0.09	0.09
DOSE - mcg/kg/min	1.95	1.79	1.79	1.53



**WE STILL DON'T KNOW HOW ANAESTHETICS WORK**

In spite of the progress and developments in anaesthesia during the last 140 years, we are still far away from any clear understanding of the mechanisms of action of the general anaesthetics. It is scarcely any easier to arrive at a definition of anaesthesia. My own working definition is in two parts:

For the unparalyzed patient, anaesthesia is a reversible, drug-induced state in which the patient does not make any gross or purposeful muscular response to surgical stimulation, and has no recollection of events. Vital functions are not unduly impaired, but there is usually some surgical stimulation of breathing. The process is rapidly reversible on withdrawing the anaesthetic agent.

For the paralyzed patient, there can be no response to surgical stimulation by movement or in the breathing, and the essential criteria are minimal autonomic response to surgical stimulation and again lack of recollection of events.

No one would pretend these definitions are particularly scientific and it is not possible to extend them into a graduated scale between "deep" and "light" anaesthesia. There is, in fact, no such thing as a graded scale of anaesthetic depth and we are inclined to rely on the intensity of the expected surgical stimulation - for example, "deep enough for a skin incision in 50% of patients" is defined as 1 MAC (minimal alveolar concentration for anaesthesia). "Deep enough for tracheal intubation" has been estimated to be about 1.3 MAC.

In the absence of any basis for constructing a graded dose/response curve for anaesthetics, we fall back on quantal dose/response curves, relating the dose of the anaesthetic to the percentage response of a sample of the population to a defined stimulation. In the case of man, the ED<sub>50</sub> for skin incision gives us MAC. This concept has been of tremendous value in comparing the potencies of anaesthetics with one another and also for studying correlations of potencies with certain physical properties. It is less clear whether MAC multiples are directly comparable from one anaesthetic to another.

Further difficulties arise from consideration of side-effects. Some such side-effects are quite clearly unrelated to the production of anaesthesia (myocardial contractility for

example) and, in contrast to anaesthesia itself, it is often possible to construct a graded dose/response curve for side-effects. In other cases, such as analgesia and central respiratory depression, it is less easy to know whether one is dealing with an effect which is quite separate from the production of anaesthesia or whether it is some part of the anaesthetic process. It must also be remembered that some side-effects are caused by biotransformation products although biotransformation is not a fundamental aspect of the process of anaesthesia. This point was made abundantly clear by the demonstration that inert gases are anaesthetics at the appropriate partial pressure.

**MOLECULAR RECEPTOR SITES****The firm ground**

A very few aspects of the subject are on firm ground and are not disputed. If we confine ourselves to the inhalation anaesthetics, we can be quite certain in drawing the following conclusions.

1. There is no relationship between chemical structure and action as an anaesthetic, except in so far as chemical structure governs physical properties.
2. Isotopes and optical isomers have similar potencies to their parent compounds. Ketamine is an exception and the rule does not necessarily apply to intravenous anaesthetics.
3. Anaesthetic potency is directly related to lipid solubility (oil/gas partition coefficient) over an extraordinarily large range (4 times 10<sup>5</sup>).
4. Anaesthetics do not act by forming covalent or ionic bonds.
5. It is unlikely that hydrogen bonding is essential for production of anaesthesia.
6. Several inert gases are typical anaesthetics at the concentration predicted from their lipid solubility.

It might appear from this list that not too many possibilities remain for a mode of action and

that just a few well directed studies might solve the problem once and for all. Nothing has been further from the truth. Many very distinguished scientists have entered the ring but success has remained elusive.

### **Lipid Solubility**

If the potency of an anesthetic is directly related to its solubility, it follows that an anaesthetic with half the oil solubility must be administered at twice the partial pressure. Therefore, at a given "depth of anaesthesia", the number of molecules of anaesthetic in the lipids of the patient will be identical regardless of which anaesthetic is used. This very strongly suggests that anaesthetics act in a lipid environment. The obvious candidate is the neuronal cell membrane, either pre- or post-synaptic and particularly the area of hydrophobic bonding between lipid and the membrane proteins.

### **Interaction with Proteins**

Alternative target receptor sites, compatible with the relationship between lipid solubility and potency, are hydrophobic areas of proteins. It is well established that anaesthetics can bind to hydrophobic areas of protein by Van der Waals bonds and, for example, a large proportion of cyclopropane carriage in the blood is attributable to binding to haemoglobin. Binding of anaesthetics will result in conformational changes in the protein structure, which may in some instances alter the properties of the protein. Thus it has been shown that many enzymes can be reversibly inactivated by exposure to anaesthetics and depolymerisation of certain labile microtubules is likely to have the same explanation. Once it is accepted that the properties of proteins can be reversibly changed by exposure to anaesthetics, there are many possibilities for anaesthetic action including changes in permeability of ionophores, neurotransmitter synthesis, transport and release and a vast range of enzymic actions. This is a field which has not yet been adequately investigated.

### **Clathrates**

One could scarcely ignore the suggestion of Linus Pauling, double Nobel Laureate, that anaesthetics might act by stabilising lattice crystals of intra-cellular water and so blocking the functions of neurones in a manner analogous to freezing of intra-cellular water and so blocking the functions of neurones in a manner analogous to freezing of intra-cellular water. It has now been shown that the propensity of inhalational anaesthetics to form clathrates correlates much less well with anaesthetic

potency than does lipid solubility and this line of thought is no longer being actively pursued.

### **Pressure Reversal**

It is well established that very high hydrostatic pressure will reverse the state of anaesthesia produced with a very wide range of drugs. The critical volume hypothesis drew the conclusion that anaesthesia was caused by the expansion of a lipid (about 0.5%) due to solution within it of anaesthetic, and this was reversed by the pressure which restored the lipid to its original volume (50-100 atmospheres absolute). Unfortunately the critical volume hypothesis has not stood the test of careful comparisons of different anaesthetics (particularly intravenous anaesthetics) which do not all respond in the same way to pressure. It now appears more likely that anaesthetics and pressure act at different sites but have effects which are generally antagonistic to each other. Studies of pressure have not yet identified the critical molecular receptor sites of anaesthetics.

### **ASPHYXIAL THEORIES**

It is perhaps appropriate at this point to digress into the possibility that anaesthetics act by blocking the production of high energy phosphate compounds (particularly ATP) in the central nervous system, generally known as Verworn's asphyxial theory. This was strongly suggested by pre-war observations on the depression of oxygen consumption of cerebral tissue slices by barbiturates. More recent studies have shown that mitochondrial oxygen uptake is blocked by anaesthetics but only in concentrations in excess of those required for anaesthesia. The block is nevertheless quite specific and occurs in the electron transport chain between flavin and quinone.

It is true that barbiturates and halothane reduce overall cerebral oxygen consumption, but this is likely to be the result of reduced neuronal traffic rather than its cause. It has recently been shown that ether and nitrous oxide increase cerebral oxygen consumption and this probably reflects the well known excitatory effects of these agents.

The key to proving the asphyxial theory of anaesthesia would be the demonstration of decreased levels of high energy phosphate compounds in the brain during anaesthesia. Very careful work in outstanding departments of neurochemistry have consistently failed to show any difference in the concentration of these compounds between the awake and anaesthetised states. Overall, the evidence is very strongly against an asphyxial theory of anaesthesia.



## ACTIONS AT NEURONAL LEVEL

It seems reasonably certain that general anaesthetics act on synaptic transmission rather than axonal conduction. It is an everyday observation while testing for neuromuscular blockade during clinical anaesthesia, that conduction of the impulse along the motor nerve is unaffected at clinical concentrations of anaesthetics. Having said that anaesthetics act at synapses, we pass from firm ground into territory which is still largely unexplored.

### The Synapse

There is a great deal of evidence to indicate that certain synapses are relatively unaffected by anaesthetics while others appear to be blocked at clinical concentrations of anaesthetics. Synapses may be classified as excitatory and inhibitory, and each group may be subdivided according to the different neurotransmitters which are used. Unfortunately it has not proved possible to generalise as to which types of synapse are sensitive to anaesthesia. It remains a possibility that anaesthesia results from activation of inhibitory synapses, particularly those with gamma-amino butyric acid (GABA) as transmitter. This is a distinct possibility for anaesthesia induced with GABA analogues or barbiturates. There is nothing extraordinary about the notion that anaesthesia might result from activation of particular synapses. Indoklon, a structural isomer of a typical halogenated volatile anaesthetic, is a pure convulsant, while enflurane, di-ethyl ether and various local anaesthetics can all cause convulsions under appropriate circumstances.

No less clear is the mechanism of how general anaesthetics cause synaptic block. Pre-synaptic block could be caused by interference with calcium entry, transmitter vesicle fusion and discharge at the presynaptic membrane. All remain valid candidates at the present time. There is, however, generally more support for post-synaptic block, which might be due to stabilisation of the post-synaptic membrane or, more specifically, conformational change of the receptor proteins which might interfere with the ability of the neurotransmitter to bind and activate the ion channel.

The very strong relationship between lipid solubility and potency suggests at first sight a unitary mode of action for all the inhalational anaesthetics. There is as yet no proof that this is the case, although different receptor sites may well have similar solubility characteristics. The possibility remains that there are

multiple sites of action with, perhaps, different anaesthetics having preferential effects on different mechanisms. Finally it must be said that there is evidence for anaesthetics acting on controller cells, which influence the excitability of post-synaptic cells in the ventro-basal thalamus. Anaesthetics excite inhibitory controller cells and inhibit excitatory controller cells. Thus it is possible for anaesthetics to block synapses without exerting any direct action on the synapse itself.

## THE CENTRAL NERVOUS SYSTEM AS A WHOLE

Our ignorance of how anaesthetics act is at its worst when we come to consider the brain as a whole. My generation of anaesthetists was reared on the view that anaesthetics acted selectively on the multisynaptic pathways of the reticulo-activating system and this resulted in loss of consciousness. Unfortunately this view is no longer tenable. It has been demonstrated that synaptic block depends primarily on the nature of the synapse rather than the number of synapses in the chain. Furthermore, direct recording from the reticulo-activating system showed that neuronal activity was not necessarily decreased during anaesthesia and could actually be increased with some anaesthetics.

Deafferentation has always been an attractive theory and detailed study of the spinothalamic tract has revealed a specific block in the ventro-basal thalamus (but not the cuneate nucleus) at clinical concentrations of a wide range of anaesthetics. The effect is reversed by pressure and the preparation is a superb model of the action of anaesthetics on the intact brain. However, there can be no certainty that this is the actual mechanism of anaesthesia itself.

When considering the central nervous system as a whole, one is even less certain that there is a single mechanism of action for all anaesthetics. Even the inhalational agents show important differences and the following distinctive properties seem to separate nitrous oxide, di-ethyl ether and cyclopropane from other currently used volatile inhalational anaesthetics:

- 1.They cause arousal during induction
- 2.They increase cerebral oxygen consumption
- 3.Electrical activity in the reticulo-activating system is increased
- 4.Less respiratory depression at 1 MAC
- 5.They increase the level of circulating catecholamines

## CONCLUSIONS

This has been an iconoclastic discourse. The destructive component has embraced the theories of critical volume, clathrates, asphyxia and the reticulo-activating system. Construction has been largely confined to small items of knowledge which cannot be more than small bricks in an edifice which is yet to be constructed. Thirty years ago, the problem looked relatively simple and one looked forward to a solution within one's working life. Now that vision has receded and expectation has been replaced with an understanding of the magnitude of the task of solving this problem, which is the most challenging our specialty has to offer. Such is the complexity of the subject that I deemed it impractical to reference every statement in the text and, as an alternative, a list of further reading is appended.

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## REGISTRARS PRIZE

### POSTOPERATIVE ANALGESIA BY CONTINUOUS EPIDURAL INFUSION OF BUPIVICAINE AND DIAMORPHINE

Dr. Alistair Lee



Prevention of pain should be our goal when considering the administration of analgesic drugs following surgery. This can best be achieved by the use of continuous infusion techniques, rather than by the intermittent use of analgesic drugs which are almost invariably given after pain has developed. Postoperative analgesia provided by the epidural infusion of local anaesthetic or opioid drugs has been described after a variety of surgical procedures and it is clear that these methods can be effective, but as yet there has been little published work comparing various epidural infusion regimes in a controlled, double-blind fashion.

It has been common practice in our hospital for several years to provide postoperative analgesia after major gynaecological surgery by means of an epidural infusion of 0.125% bupivacaine plain solution, with the addition of intramuscular diamorphine as necessary. More recently we have been administering the diamorphine epidurally in combination with the bupivacaine solution, in the expectation that the sensory blockade will be better maintained and superior analgesia produced.

In this study, we compared three epidural infusion regimes in a randomised, double-

blind manner, and considered analgesic efficacy, side effects and the safety of the technique.

Sixty patients undergoing major gynaecological surgery through a lower abdominal incision received a standard anaesthetic and were randomised to one of three groups. Patients were premedicated with diamorphine 5mg and atropine 0.6mg intramuscularly. An epidural catheter was inserted (T10-11 or T11-12) and 18ml of lignocaine plain solution injected. Light general anaesthesia was induced with thiopentone and maintained with nitrous oxide 66% and halothane 0.5% in oxygen. After one hour, 10ml of bupivacaine 0.5% plain solution was injected epidurally. At the end of surgery an epidural infusion was commenced. The patients were randomly allocated to receive 15ml bupivacaine 0.125%, 15ml 0.9% saline containing 0.5mg diamorphine or 15ml bupivacaine containing 0.5mg diamorphine during each hour.

Pain was assessed by visual analogue score at 2, 4, 6, 12 and 21 hours after surgery. At the same time intervals the level of analgesia to pin-prick testing and the presence of any side effects were noted. If the analgesia provided by the epidural infusion became inadequate, a final assessment was performed, the infusion was stopped and the patient treated subsequently with intramuscular diamorphine. Comparisons of analgesia between groups were made using Kruskal-Wallis and Mann-Whitney tests. Levels of block were compared using Mann-Whitney tests and numbers of patients requiring additional analgesia by a chi-squared test. At every assessment pain scores in the patients receiving the mixture were significantly lower than in those who received either bupivacaine or diamorphine alone. There were no statistically significant differences in pain scores between the latter two groups. Only one patient had to be withdrawn from the "mixture" group because of inadequate pain relief. Half the patients in each of the other two groups were withdrawn because they requested further analgesia, and by the end of the study there

were significantly more patients remaining in the group who received the bupivacaine and diamorphine in combination.

There was no difference in the level of block Between the two groups who received an infusion containing bupivacaine. In spite of this the patients who received diamorphine in addition had much better analgesia. There was no evidence of respiratory depression(<10 breaths/minute) in any patient after commencement of the infusion. Only one patient required treatment for hypotension and this responded promptly to intravenous ephedrine.

Other side effects as nausea, vomiting, urinary retention and itching occurred, but in no case presented major problems of management.

This study demonstrated that postoperative analgesia provided by an epidural infusion of bupivacaine and diamorphine is superior to the analgesia provided by either drug alone. The technique had a high level of patient acceptability and no major side effects were encountered. It is concluded that this technique has much to offer in the management of postoperative pain.





## REGISTRARS' MEETING

**Western General Hospital, Edinburgh, May 29th.**

The Scottish Health Services Centre at the Western General Hospital was the venue for this year's Meeting. Over fifty registrars were welcomed by the President, Dr. W.R. Macrae and then divided into groups to rotate through a varied morning programme of demonstrations.

Dr. K.B. Slawson and Dr. I.T. Davie gave an interesting insight into the renal transplantation programme in Edinburgh including the financial advantages of transplantation as opposed to dialysis, the pre-operative problems encountered with transplant patients and how they are dealt with, and the anaesthetic technique used. A video of the intra-operative monitoring employed was also shown and the importance of proper pre- and post-operative hydration emphasised.

Dr. A. Mowbray from the Royal Infirmary encouraged us to adopt neuromuscular blockade monitoring as a routine and described the various methods available with their advantages and disadvantages. For ease of use and reproducibility visual estimation of a train-of-four stimulation of the ulnar nerve at the wrist or elbow was preferred and the correlation between train-of-four response and degree of blockade explained.

The sometimes difficult topic of fluid balance in paediatric anaesthesia was elucidated by Dr. T. Winning with the aid of an excellent handout. He then gave an account of the use of caudal blocks in children for post-operative analgesia pointing out that it was simple and effective, and one technique could be used for a variety of surgical procedures in the lower part of the body.

Dr. Brooks (in place of Dr. D. Child) showed some video clips of quadriplegic patients including demonstrations of devices for measuring various respiratory volumes, and home ventilation. It was clear that all the patients although severely handicapped valued their quality of life.

Some of the latest methods of intra-cranial pressure monitoring were described by Dr. M. Dearden including fluid filled systems and fibre-optic systems with catheter-tip transducers. Mr. I. Piper then explained the various

waves associated with raised intra-cranial pressure and demonstrated some research work on computerised Fourier analysis of the intra-cranial pressure waveform as a possible method of predicting a rise in pressure.

Finally Dr. J.L. Jenkinson gave a very useful Summary of neurophysiological monitoring. After explaining the various waves seen in electroencephalography and describing methods of producing evoked potentials he demonstrated tracings from the cerebral function analysis monitor. Unfortunately time did not permit viewing of a video on dorsal column stimulation by implanted electrodes.

After lunch there was an opportunity to participate in a quiz of "Anaesthetic Objets d'Arts". Encouragement to take part was given by the promise of cash prizes!

The theme for the afternoon session was "The Safety of the Anaesthetist". The chairman, Dr. N.H. Gordon, introduced Prof. A.A. Spence who spoke on morbidity studies in women doctors. Earlier studies of this subject had suggested the possibility that the hazardous environment of the operating theatre could be associated with an increase in obstetric morbidity in female theatre personnel. However the most recent study carried out on a nationwide basis in the U.K., while yet to be fully analysed, appeared to show very little of great importance in both obstetric and non-obstetric morbidity. Whether this was due to the greater use of scavenging systems or not would probably never be known. In response to questioning Prof. Spence felt that the recent study confirmed that there was no prima facie case for a similar study in male theatre personnel.

The next speaker, Dr. A. Neal, a Lecturer in Medicine with an interest in epidemiology, continued the encouraging message with a fascinating report of a survey of mortality amongst U.K. domiciled anaesthetists from 1957-1983. Against the background of a study in the U.S. which showed an excess mortality from suicide and lymphoma amongst anaesthetists, the British study found that in all causes of death up to 65 years of age anaesthetists had a lower standardised mortality

rate compared with other Social Class 1 males apart from poisoning and suicide. However the increase in the death rate from suicide was not statistically significant. The death rate for all cancers was significantly less amongst anaesthetists compared with Social Class 1 males and there was no evidence of a higher rate of suicide amongst anaesthetists compared with other doctors. The final speaker was Dr. R. Brettle, Consultant in Infectious Diseases at the City Hospital, who spoke on AIDS and the Anaesthetist. While AIDS in the U.K. was associated largely with homosexual males, in Scotland the majority of sufferers were drug abusers with a consequent increase in the proportion of females affected. This had implications for further spread in the hetero-

sexual population, and for transmission during pregnancy to the foetus. The highest concentration of cases was in Edinburgh and the risk of anaesthetists sustaining an inoculation injury with infected blood was highlighted. Personal practice in venepuncture technique should be modified to minimise the possibility of contracting the virus in the course of everyday duties.

The meeting was brought to a close by the President who thanked all those who had helped to make it a success, in particular Dr. N.H. Gordon and Dr. L. Rutledge for the excellent organisation. He then presented the first prize in the Objets d'Arts to Dr. Kruger of Edinburgh.





## SCIENTIFIC MEETING

### ABERDEEN, NOVEMBER 20th, 1987

This year's Scientific Meeting was held in the Medico-Chirurgical hall at Aberdeen Royal Infirmary and was organised by Dr. J.D. McKenzie. Over 100 members were welcomed by Dr. Edith Beveridge who introduced the Chairman for the morning session, Dr. J.W.L. Parry. After a varied programme culminating in a fascinating account of "Opioid Peptides - past, present and future" by Prof. Hans Kosterlitz lunch was served in the nearby refectory. The afternoon session had an obstetric anaesthesia flavour to it and was chaired by the President Dr. W.R. Macrae. He confessed that it was a very long time since he had been involved in this field although this did not prevent him on occasion from commenting on it! Abstracts of six of the papers are printed below and indicate the excellent quality of the meeting. In particular Dr. McKenzie is to be congratulated on including in the programme two speakers of world renown in their respective fields, Prof. Kosterlitz and Dr. Tunstall.

After tea the tenth Gillies Memorial Lecture was delivered by Dr. J.I.M. Lawson of Ninewells Hospital, Dundee who gave a memorable address on some of the early work with muscle relaxants in the U.K.

Finally, the President presented Dr. Lawson with the Gillies Memorial Vase and concluded the meeting by thanking all who had made it such a successful event.

#### THE STRESS RESPONSE TO INDUCED HYPOTENSION FOR CEREBRAL ANEURYSM SURGERY: A COMPARISON OF TWO HYPOTENSIVE TECHNIQUES

Dr. M. Macnab

Plasma adrenaline (PA), plasma noradrenaline (PNA), plasma renin activity (PRA), mean arterial pressure (MAP) and heart rate (HR) were measured before, during and after induced hypotension in two groups of patients undergoing cerebral aneurysm surgery. In Group 1 isoflurane was used to maintain anaesthesia and induce hypotension. Mean PA fell significantly during hypotension and remained reduced after hypotension, mean

PNA remained unchanged, while mean PRA rose slightly but not significantly during hypotension, falling again after hypotension. In Group 2 halothane was used to maintain anaesthesia and sodium nitroprusside to induce hypotension. During anaesthesia and surgical stimulation PNA and PRA were significantly greater compared to Group 1. Mean PA, PNA and PRA all rose during hypotension and remained elevated after hypotension. The rise in PNA and PRA was statistically significant. After hypotension the MAP in Group 2 was significantly higher when compared to Group 1. There was no significant change in HR during the study in either Group. In conclusion, isoflurane anaesthesia unlike halothane anaesthesia attenuated the stress response to surgical stimulation and isoflurane-induced hypotension attenuated the stress response to induced hypotension and was not associated with rebound hypertension.

#### A REVIEW OF CARDIAC OUTPUT MEASUREMENT

Dr. J.M. Rawles

Although volumetric cardiac output is a cardiovascular parameter of fundamental importance, its measurement is poorly reproducible and invasive or technically difficult, rendering it unsuitable for use in the majority of patients in whom a knowledge of overall cardiovascular function would be desirable. In particular, thermodilution, which up to now has been the gold standard for cardiac output measurement, is riddled with compromises so that the absolute values of cardiac output obtained are unreliable and repeatability is poor.

Linear cardiac output, on the other hand, is a simple, non-invasive and highly reproducible measurement that may be made at the bedside using Doppler ultrasound. The systolic velocity-integral of a single heart beat is known as stroke distance and it may be envisaged as the distance travelled by mid-stream blood with each beat. Within subjects stroke distance is proportional to stroke volume and it is

independent of body size. Providing there is no aortic disease, stroke distance may be used as an absolute indication of cardiac output and for following serial changes.

### **ABERDEEN INTENSIVE CARE UNIT SYSTEM (ABICUS)**

**A Medical Information Organiser, Adviser and Auditor**

Dr.D.G.Ross

ABICUS is a computer program designed to collect information from monitors connected to patients in ICUs or high-dependency units. The system keeps and maintains a complete data-base for each patient and provides an interface for medical staff to interrogate the data-base for statistics and audit. The system provides advice, derived values and calculation facilities, and a Medical Advice System (MAS) component is under development. The program consists of three modules:

#### *1. ICOS: Information Collection and Organisation System*

Each set of bedside monitors is connected to a dedicated microcomputer which runs the ICOS program. The monitors are regularly polled by the software and the results stored on a single, dedicated flexible disc. The micro is also used to store relevant medical and nursing notes and fluid balance charts. The biochemistry and haematological results will be handled automatically in future versions. All of this information is available for instant retrieval, and various algorithms are built-in to provide automatic calculation and display of derived variables such as A-a dO<sub>2</sub>, creatinine clearance and APACHE scores.

The user can call on "Help" pages which provide information on drug dosage and administration, and guidance on how to use the system. A calculation facility provides the means for setting up complex drug dilutions and administration rates accurately and rapidly.

#### *2. DBS: Data Base System*

The individual bedside micros are connected by a local area network to another computer, the Network Controller, which runs the DBS. This program extracts specific information from the data record of each current patient and constructs its own, summarised, database. The user can call on pre-arranged, tailor-made

query forms for audit purposes, or the database may be interrogated on a "one-off" basis.

#### *3. MAS: Medical Advice System*

The overall structure of MAS has been designed in outline and a prototype constructed, using the Expert System shell S1. MAS will poll the bedside microcomputers at intervals and analyse data and trends. Resulting activity will vary from a hierarchy of alarm outputs to advice on treatment or further investigations. Diagnostic capabilities are part of the design, although in most ICU situations, trend analysis and therapeutic advice will form the bulk of MAS's activities. Although MAS will function primarily as a module of ABICUS, it is intended to be operable as a stand-alone interactive program which could be utilised in situations remote from skilled medical personnel.

### **2% LIGNOCAINE WITH ADRENALINE 1/200,000 FOR EPIDURAL CAESAREAN SECTION**

Dr.A.Norton

A randomised double blind controlled trial of freshly prepared 2% lignocaine with 1/200,00 adrenaline and 0.5% plain bupivacaine was performed in sixty patients undergoing elective Caesarean section. Adrenaline was added to autoclaved 2% lignocaine in order to avoid the problems of a low pH of commercial adrenaline containing 2% lignocaine, to avoid the use of preservatives such as sodium metabisulphate in the epidural space, and to lower the potential of systemic toxicity with a mean dose of 502.6mg of lignocaine.

The use of 2% lignocaine with adrenaline enabled epidural blockade to be established in a significantly shorter time than with 0.5% bupivacaine ( $p < 0.01$ ). 2% lignocaine provided adequate duration of blockade in all patients and the incidence of complications such as hypotension and urinary retention was similar in both groups. Motor blockade was more intense with 2% lignocaine. There was no statistically significant difference in the quality of analgesia achieved in both groups, but a reduced frequency of poor quality blocks was noted with lignocaine as compared to bupivacaine. No patient required general anaesthesia. A higher, but not significant, incidence of moderately depressed Apgar scores (5-7) at 1



minute was noted in the lignocaine group. There was no difference at 3 minutes. This finding may be related to the higher foetal/maternal ratio of lignocaine than bupivacaine. The level of patient satisfaction was high in both groups.

0.5% bupivacaine is the standard agent for epidural section, but has the disadvantage of latency of onset and a relatively high incidence of a less than ideal quality of analgesia. Freshly prepared 2% lignocaine with adrenaline can be considered a useful alternative to 0.5% bupivacaine for epidural Caesarean section.

#### **A CLINICAL AUDIT OF SPINAL ANAESTHESIA FOR CAESAREAN SECTION**

Dr.M.E.Tunstall

The incidence of mothers requesting regional anaesthesia for Caesarean section in Aberdeen has risen since 1980. That year there were 46 list Caesarean sections under regional anaesthesia: 37 spinals and 7 epidurals. In the 12 month period from May 1986 to April 1987 inclusive the corresponding number was 139 - 133 spinals and 6 epidurals. In this latter period there were 120 general anaesthetics for list cases. For other non-list / emergency Caesarean sections the figures were 35 spinals, 95 epidurals and 290 generals. Total Aberdeen confinements were 5183. Total sections were 679 (13.1% of confinements).

The advantage of spinal anaesthesia is that it is relatively simple, swift, successful and safe. The quoted disadvantages are unpredictability, hypotension and headache. The spread of local anaesthetics in the subarachnoid space of subjects in the latter part of pregnancy is uniquely influenced by changes in vertebral venous congestion caused by changes in the posture of the patient. The simple manoeuvre of changing from the lateral position for lumbar puncture to the supine significantly increases the spread of the block. The timing of this change can also make a significant difference. The levels of block and their predictability following one particular manoeuvre will be presented graphically.

The hypotension of spinal anaesthesia may be prevented and effectively treated by intravenous fluid loading, the administration of ephedrine and a vigorous approach to avoiding aorto-caval compression. The regimen used and the results with regard to changes in blood pressure will be presented.

Post lumbar puncture headache is avoidable in most cases. The needle should be no greater in size than 26 gauge. The needle should be

inserted through the dura mater with the bevel facing laterally. More than one dural puncture should be avoided. Needles of 29 gauge are currently being assessed. A report from an ESRA meeting indicates an extremely low incidence of post lumbar puncture headaches with 29 gauge needles. The local statistics based on a patient questionnaire which is completed on the fourth or subsequent post-operative day will be presented.

Various alternatives in technique have been randomly allocated in over 170 sections under spinal anaesthesia to date and the results are evaluated. Spinal anaesthesia allows a very high level of patient satisfaction in obstetrics. While spinal anaesthesia is a relatively old technique the way that it is administered today causes it to be a technique of first choice in most cases for elective Caesarean section and in some cases of emergency Caesarean section.

#### **FAILURE OF OXYTOCIC AGENTS TO REDUCE BLOOD LOSS AT SUCTION TERMINATION OF PREGNANCY: A CONTROLLED STUDY OF FOUR REGIMES**

Dr.R.C.Rodgers and Dr.J.J.Janczak

Oxytocin and ergometrine are commonly administered during termination of pregnancy to minimise blood loss. 223 patients undergoing termination were studied in a prospective controlled blind analysis of four regimes, using a standard anaesthetic technique avoiding inhalational agents and opiates. Each group received either ergometrine 0.5mg bolus, ergometrine 0.5mg by infusion, oxytocin 5 units by infusion, oxytocin 8 units by nasal spray or no oxytocic as control.

None of the regimes studied produced a significant difference in blood loss when compared to controls. Neither did any have an effect on the incidence of post-operative sequelae.

Some groups produced significant haemodynamic changes. Ergometrine caused rises in systolic and mean arterial pressures over controls by either route ( $p < 0.05$  to  $p < 0.001$ ). Oxytocin infusion caused increased heart rates ( $p < 0.05$  to  $p < 0.001$ ) and decreased systolic and mean arterial pressures below control values. Oxytocin as intranasal spray produced similar haemodynamic changes to controls. The routine use of oxytocic agents during suction termination would seem to be questionable.

No summary was received from Prof. Kosterlitz.

## RELAXATION - A HISTORICAL PERSPECTIVE

I chose the subject of relaxation because it was the principal hurdle which had to be surmounted to allow our surgical colleagues freedom to operate without constraints imposed upon them by shortcomings in anaesthetic management. Its solution also opened the door to important advances in the specialty which have helped to make it what it is today.

Looking back into history I was soon aware of how difficult it is to discover origins. I was reminded of a day spent with a Czech friend among the hills of northern Bohemia. At one point he remarked that we were standing on the source of the Elbe: any streams were too small to be noticed yet a great river was to flow from them. One has also to remember that no invention is of great value, however creditable to the mind that originates it, until it is developed into such shape as to become practically valuable.

In the 1st volume of *Anaesthesiology* (1940) Noel Gillespie(1) of Wisconsin published a "meditative essay" on relaxation which began: "Despite the peaceful significance of this word, probably no subject has ever given rise to more controversy between surgeon and anaesthetist". He discussed various methods available to solve the problem (curare was not yet introduced), coming down firmly for ether. Chloroform was too dangerous, cyclopropane often produced respiratory depression out of proportion to its relaxant action and spinal analgesia could cause cardiovascular depression and impose too great an emotional strain on the patient. I shall return to spinals later.

Gillespie mentioned a difficulty which often accompanied relaxation of the abdominal muscles - over-active diaphragmatic contractions. To deal with this threat to good operating conditions he briefly mentioned two solutions, ether insufflation and controlled respiration. The first was an "almost obsolete" technique, based on the work of Meltzer and Auer(2), the New York physiologists who in 1909 had shown it was possible to keep an apnoeic, curarised animal alive by continuous insufflation via a narrowbore tube reaching to near

the carina. The technique was soon used clinically (without curare) by Elsberg(3). At first its principal indication was thoracic surgery, providing emancipation from the cumbersome pressure chambers which had been introduced some years beforehand, but its use was soon extended to operations on the head and neck. The advantages of insufflation in abdominal surgery were presented in a *Lancet* editorial(4) of 1913 where it was stated that reduction in pulmonary excursion made abdominal operations much easier to perform. The editorial described the basic work of Meltzer as a convincing example of the value of experiments by the pure scientist unshackled by professional cares and free from the "idee fixe" which often tended to keep the anaesthetist within well worn paths. Gillespie may have regarded insufflation as obsolete in 1940 but even as late as 1951 I was using Kelly's apparatus for abdominal surgery in Liverpool. Ether insufflation had first been introduced to the U.K. from the United States in 1912 by Robert Kelly at Liverpool Royal Infirmary and one of his surgical disciples was still insisting on its use for abdominal surgery in his theatre. With an insufflation flow rate of around 20 litres/minute quiet respiration was certainly achieved.





Soon after the introduction of insufflation anaesthesia some workers were appreciating that there was advantage in rhythmic ventilation, an early form of which was to allow the constant inspiratory pressure, usually around 5mmHg, to drop to zero several times per minute, and in 1913 a ventilator was constructed by Janeway(6) of New York. It was not, however, until the 1930s that IPPV as we understand it today came into anaesthesia. In 1933 Anderson, Crafoord and Freckner(7) of the departments of surgery and otolaryngology at Stockholm began to design their Spiropulsator; they had been unimpressed with the various techniques of local, spinal and general anaesthesia with spontaneous respiration for thoracic surgery which they had seen in Germany, England and the U.S.A. A typical anaesthetic of the period was described in 1932 by Ross MacKenzie(8) in an address to the Aberdeen medico-chirurgical society - local anaesthesia and nitrous oxide/oxygen/ether with 5-7mmHg positive pressure. It was not until 1940 that the Swedish workers had fully developed their method: heavy premedication was followed by an intravenous barbiturate induction, the larynx was cocaineised, a cuffed tube inserted and hyperventilation by Spiropulsator commenced with nitrous oxide and oxygen and occasionally cyclopropane: relaxation was achieved by intercostal nerve block. The technique was clearly not ideal for general use and a simpler and more predictable approach, using cyclopropane, a Waters absorber and manual ventilation was described by Nosworthy(9) at the Royal Society of Medicine in 1941, setting the pattern for modern thoracic anaesthesia.

Nosworthy's was the technique which I was to see some years later in 1947 as house surgeon to Andrew Logan's Thoracic Unit at the Eastern General Hospital in Edinburgh. The anaesthetist was James Straton who has most kindly given me his record cards of the period. They provide an object lesson in record keeping and include follow-up for several days post-operatively. His usual method of anaesthesia for thoracotomy at the time was omnopon/scopolamine/atropine premedication, induction with thiopentone, intubation, and controlled respiration through a Waters absorber. Curare, though now available, was not yet used

in every case. As house surgeon my duties included setting up the cut-down drip and cocaineising the trachea for the routine pre-operative bronchoscopy to clear secretions - no doubt the topical analgesia also facilitated intubation.

IPPV was also making an appearance in abdominal surgery. In 1934 Guedel and Treweek(10) described their method of producing apnoea by hyperventilating patients through a Waters absorber; the only advantage claimed was a quiet operating field. Six years later Guedel(11) reported the administration of cyclopropane, in a maximum concentration of 75%, with controlled respiration in 8000 cases. He described the term respiratory paralysis as a bugaboo, i.e., a fear with no foundation (derivation, Cornish). Relaxation equalled that obtained with spinal anaesthesia. The paper included an interesting harbinger of the present day. Guedel was aware of the occurrence of arrhythmias but believed they were of no importance if oxygenation and carbon dioxide elimination were ensured. However, they had recently come to realise that they must do something to protect themselves against the great fear that "present day teaching" was building up regarding such arrhythmias, so that they now considered it advisable to attach a precordial stethoscope. By 1940 the value of IPPV had been demonstrated for both thoracic and abdominal surgery, but only for the former had it become recognised as the method of choice and there was still some resistance to its general acceptance, e.g., even an authority such as Beecher(12) still did not see IPPV as an essential part of thoracic anaesthesia. It was not entirely surprising, therefore, that its establishment in abdominal surgery was to be delayed for many years.

As early as 1909 in the U.S.A. curare was being injected into dogs under ether insufflation to control diaphragmatic movement during experimental surgery. In 1912 Lawen(13) of Leipzig used it in man, having satisfied himself that curarised animals could be kept alive by artificial respiration and that "curarine intoxication" was a poison which could be "controlled with perfection". Lawen postulated a concept of balanced anaesthesia with narcosis (ether), local anaesthesia to weaken sensory stimulation and motor activity, and curarine to

insert a block between motor nerve endings and striated muscle. Lawen's contribution was not followed up and curare did not come into anaesthesia for a further thirty years. When Gillespie published his essay on relaxation in 1940 it had recently entered psychiatry to modify metrazol convulsive therapy, and it was this which led to its introduction into anaesthesia in 1942 by Griffith and Johnson (14) of Montreal. They injected only relatively small doses, without reversal. The first report of curare in anaesthesia in the U.K. was in 1945 by Mallinson(15) and it is interesting to note that he would briefly ventilate in order to mitigate the vigorous and disturbing diaphragmatic movement in patients who were being allowed to breathe spontaneously. It was, however, to be many years before a link between curare and Guedel's work on IPPV for abdominal surgery was forged. Most of the credit for this belongs to the Liverpool school. Curare was first used there by Halton in order to reduce thiopentone dosage during thoracic anaesthesia. In 1946 Gray and Halton(16) presented a description at the Royal Society of Medicine of the use of curare in over 1000 cases - "A Milestone in Anaesthesia?": there was as yet no deliberate attempt to control respiration and they had used physostigmine reversal only twice. Curare was further discussed the following year at the R.S.M.(17) when some idea of the controversy surrounding it became evident. Organe reported that he had used only small doses, rarely assisted ventilation and noted a disturbing incidence of postoperative chest infection. Gray and Halton insisted on the importance of aided respiration, and Halton expressed the hope that the milestone would not become a tombstone. Gillies described the death of a very ill neonate, which was a portent of the particular difficulties to be encountered in this age group. Forrester gave an account of 500 administrations in Glasgow and, interestingly, was anticipating later practice by using curare during ill non-abdominal procedures for its "shock-sparing" effect. Massey Dawkins believed it did patients more harm than good. It must have been very soon after this meeting that Gray and Rees(18) moved to control respiration with nitrous oxide, oxygen and relatively large doses of curare with routine reversal by neostigmine.

Their paper "The role of apnoea in major surgery", which was published in the BMJ in 1952, suggests that it had been their standard method over the previous six years.

In April 1948 I left the Thoracic Unit in Edinburgh for a very different kind of job - the sole resident anaesthetist/casualty officer at Harrogate General Hospital. If this sounds like an impossibly onerous post I would point out that although in those days more was expected of us in some ways, life was much less stressful in others. I had been trained in neither discipline but struggled through under the tutelage of an ex-service casualty sister who taught me the rudiments of both. As a result of my thoracic experience I was no stranger to the Magill laryngoscope but where intubation was expected (relatively unusual in those days) I preferred to introduce the tube under topical cocaine before inducing anaesthesia. For many weeks I did not dare use curare which must account for my never losing anyone "on the table". It also meant that I knew what it was like to have to anaesthetise for abdominal surgery without the benefit of muscle relaxants - indeed two operations had to be abandoned owing to my being unable to produce adequate operating conditions. I never expected a patient to die from my administrations - rather had I entered into a contest with him which I had to win, and the outcome was by no means certain. The quality of the visiting anaesthetists was high and when my interest in the specialty became obvious I received valuable training. One was beginning to take up the Liverpool technique while his colleagues still used curare with cyclopropane and spontaneous respiration. I still have records of all the anaesthetics I gave in Harrogate. Ether predominates at the start, moving to thiopentone and cyclopropane, with a little curare if relaxation was poor, and the occasional spinal. After Harrogate came the Army and I applied for an anaesthetic posting. As my commanding officer was an Edinburgh graduate like myself, he favoured me with the opportunity to display my skills. I was given a huge sergeant to anaesthetise for dental extractions with nitrous oxide and oxygen; the result was a fiasco and I was drafted to general duties.

On leaving the Army I set about looking for formal training and applied successfully for



the year's course at Liverpool, with a resident anaesthetic post at Liverpool Royal Infirmary, starting in October 1950. It is impossible to exaggerate the atmosphere of enthusiasm and high morale prevailing there with Gray, Rees, Dundee and others less well known. The "Liverpool technique" had been established now for some years and was clearly a real advance over the then more conventional methods of using curare. Although I practice it still as I was taught in 1950, I have come to feel that there is something incomplete and even aesthetically unpleasing about an anaesthetic technique that maintains patients at a level that they would be reacting physically to stimulus were it not for the relaxant. So nowadays for major surgery I like where possible to build the anaesthetic on a foundation of spinal or epidural block, whether or not IPPV is indicated.

Liverpool provided other fascinating experience. In a centre which had produced Minnit, it was appropriate that in obstetric anaesthesia it should be ahead of its time. Caesarean sections were anaesthetised by a sequence of curare, thialbarbitone (Kemithal) and nitrous oxide/oxygen. Towelling-up was completed before induction as it was believed to be important to deliver the baby as soon as possible to minimise the amount of barbiturate crossing the placenta. A favourite emergency operation was the Wilson-Hey prostatectomy, where blood pressure was varied according to the surgical needs by means of spinal anaesthesia and adrenaline infusion - surely an early example of controlled hypotension. Kelly's apparatus I mentioned already. A type of apnoeic insufflation using gallamine was also employed for oesophagoscopies, using a gum-elastic catheter attached to a Magill circuit. This may have been a relic of the days when the early to-and-fro endotracheal tubes, e.g., Kuhns, were regarded as too clumsy for ENT surgery. The art of anaesthesia was fully recognised and an important part of the course was to see Hargreaves' technique of inducing patients with ether alone. It was an impressive performance. He believed that Guedel had misnamed Stage 2: it should be Excitability, and the onus is on the anaesthetist to minimise excitement by gently, hypnotically talking the

patient through to surgical anaesthesia. Such advice remains relevant to inhalational inductions today. Another interesting memory of Liverpool was Esplen's ventilator(19). It was a brilliant conception working by means of gas pressure and magnets and had been built in his home workshop. It must surely have been the first British anaesthetic ventilator. The machine was marketed later as the Aintree ventilator and we bought one for Dundee, but it never worked as reliably as the prototype. I remember also Winterbottom(20), an excellent teacher. He had the courage to be the first to report "Awareness", resulting from his failing to notice that the nitrous oxide bobbin had dropped from registering 1 litre to zero (at the time patients were ventilated with 1 litre each of nitrous oxide and oxygen through an absorber). As controversy still surrounded the Liverpool technique subsequent correspondence was critical. Massey Dawkins quoted Oliver Wendell Holmes on "Anaesthesia", "The fierce extremity of suffering has been steeped in the waters of forgetfulness and the deepest furrow in the knotted brow of agony has been smoothed forever". It would be unfortunate, added Dawkins, if the modern anaesthetist should ever forget that although curare may smooth the furrow it does not eliminate the agony.

I had hoped that I would obtain a registrar post in the Liverpool region when the course ended in September 1951. However, at a stroke, the government cut the registrar establishment and I ended up in my home town of Dundee. The head of the department was Shearer, whose standard anaesthetic for abdominal surgery at that time was high spinal anaesthesia, blind nasal intubation, and nitrous oxide, oxygen and ether. He soon adopted the Liverpool technique and, despite the increased bleeding, the surgeons also preferred it. Psychologically there is no doubt that my Liverpool experience had provided me with a most secure launching pad for my career. My faith in it was almost naive, and it was all the more disturbing to find that things could go wrong. For the first time I began to meet "neostigmine resistant curarisation". In Liverpool I had been protected from this complication as the Royal Infirmary had only a limited emergency commitment and could virtually

choose its emergencies. Among these were few dilapidated patients with ileus, whom Hunter (21) was later to describe as typical candidates for this complication. I cannot recall my early days in Dundee without some unease as lives could surely have been saved had we possessed the staff (I was one of two registrars) and facilities for post-operative ventilation. When Hunter eventually described neostigmine resistant curarisation in 1956 the sense of relief amongst anaesthetists that it was a widespread problem could be felt from the spate of letters which followed his article. There was one gain - the threat of its occurrence encouraged precision in anaesthetic technique. As far as I was concerned, where trouble was anticipated I readopted cyclopropane, and controlled ventilation with the help of a combination of succinylcholine and decamethonium iodide. This difficulty apart, the neuromuscular blocking agents were still causing controversy. It was fuelled by the publication in 1954 of the investigation by Beecher and Todd(22) into deaths associated with anaesthesia and surgery in the U.S.A. Their conclusion was that when muscle relaxants entered the circulation the death-rate rose by a factor of 5, that curare was toxic and that this group of drugs was still on trial. Two years later a more accurate perspective was presented when the Association of Anaesthetists(23) produced the first report on anaesthetic deaths and concluded that the great majority were due to some serious departure from standard anaesthetic practice. In some ways it might be said that curare had come in before the specialty as a whole was ready for it. Among the letters that had followed Hunter's 1956 article was one from Gray who recommended that all hospitals should have at least one ventilator in order to manage postoperative respiratory insufficiency; this would also have the advantage of providing a pool of ventilators should an outbreak of poliomyelitis occur. It was a genuine threat. In 1952 Denmark had experienced a severe epidemic. The first month produced 31 cases with severe respiratory problems, of whom 27 died. Treatment had been as in previous Scandinavian epidemics, with tank or cuirass ventilators (of which there were too few) and tracheostome. Developments in anaesthesia, not least the use

of curare and the ever increasing appreciation of the advantage of IPPV, suggested a new approach to management. The physician concerned, Lassen (24), brought in his anaesthetist colleague Ibsen, who devised a simple, readily available system of respiratory support. A cuffed tracheostome tube was introduced under cyclopropane anaesthesia and IPPV performed by relays of students working 8 hour shifts to provide manual ventilation; they were paid £1.50 per day. Mortality fell from 90% to 40%. Visitors to Copenhagen included Shearer from Dundee, accompanied by Jamieson, the physician-superintendent of the local infectious diseases hospital. Their report to the Board secured the provision of a number of ventilators in Dundee (an outcome which must have been paralleled in other regions) and permission was given to employ some in theatre pending an epidemic, which happily did not materialise. The Danes had shown how an anaesthetic technique could be successfully adapted for therapeutic purposes and the foundations of Intensive Care had been laid. Jamieson tells me that Ibsen did not receive the credit which was his due, but that was typical of the times.

As the decade progressed the recognition of IPPV as a life saving measure gained ground. When I qualified it would not have been thought of, even for a major chest injury. I witnessed the management of such a case in Edinburgh in 1947. On Sunday, 27th October, the 11.15 express from Waverley to King's Cross jumped the points six miles south of Berwick. The driver, an overweight bronchitic in his 60's, suffered a severe stove-in chest. He was taken to Edinburgh Royal Infirmary where Logan inserted a chest drain, after which he was transferred to the Eastern General Hospital, desperately ill. Treatment was by oxygen inhalation antibiotics, repeated bronchoscopy by Logan himself, day and night, and vigorous physiotherapy. He believed so strongly in physiotherapy that the physiotherapist accompanied us on the daily ward round. It was Intensive Care, 1947 style, and the patient made a full recovery. The driver later told me that he had been diverted on to a loop line which he took at 80 m.p.h. as he had failed to see a chalked notice in the driver's room at Waverley station informing



him of the diversion. Nine years later an accident, also on a railway, was responsible for the first report (by Avery and Morch(25) of Chicago) of a similar injury being successfully managed by mechanical hyperventilation with curare.

Ventilators were now appearing in the wards, and standards of care were subtly improving. The first report of a post-operative observation ward in the U.K. (at Southend) appeared in 1956(26), and cardiac surgery was striding ahead. A paper(27) was published in 1960 in the *Journal of the American Medical Association* advocating intensive therapy as part of a 4-stage plan of progressive patient care. In 1964 an anonymous report appeared in the *Lancet* (28) describing the opening by Melrose of the first purpose built ICU in England at Whiston in Lancashire. It was staffed by individuals of several disciplines based at Liverpool University. Whiston Hospital may have opened the first unit in England, but I believe that the unit in Glasgow Royal Infirmary is celebrating its 25th anniversary this year. Not everyone was so fortunate. In 1964 I wrote to our staff association asking for support in providing a unit in Dundee. The letter described a problem which many here will recognise:

"The difficulties in providing special respiratory care for patients behind screens in an over-worked and understaffed general ward can hardly be exaggerated, and the use of a small ill-equipped side-room is no answer. Distress is caused to other patients, equipment is damaged and lost, plugs don't fit, attempts at asepsis are hopeless, tempers are frayed and treatment is inefficient". We had to wait for over a decade and the move to Ninewells before we had one.

Now the need is for high dependency areas, not least to be able to employ safely and efficiently the more effective and sophisticated methods of postoperative pain relief now available. To my pleasure and some surprise, the news from Ninewells is encouraging. With commendable speed a 5-bed bay has been set aside and, by disposing staff flexibly between the theatres and recovery area, nurses found to man it. We did, however, start with the advantage of having a large reception/recovery area with spare capacity.

Turning to spinal anaesthesia, its well recog-

nised ability to give excellent skeletal muscle relaxation was not at first seen as an important advantage. In a contemporary assessment of its place in anaesthesia made at the 1905 German surgical conference, at which Bier was present, the consensus of opinion was that it was unsuitable for intra-abdominal procedures. However, by 1909 Jonnesco(29), an enthusiast who employed spinals even for ophthalmic surgery, was recommending them for abdominal operations, where he welcomed the "congealed viscera" and "abdominal stillness" characteristic of the technique. As methods improved spinal anaesthesia became first choice of many abdominal surgeons. But reservations persisted, particularly among anaesthetists(30) (spinals were predominantly a technique of surgeons), regarding uncertainty of effect, distress caused to patients, neurological sequelae and unexpected collapse. The action of spinal anaesthesia on the circulation received only sporadic attention. It was realised that "shock" and spinals did not go well together, e.g., in an admirable report from the battlefield in 1917 by Marshall (31), a clear distinction was drawn between the suitability for spinal anaesthesia for those with minor injuries, and the severely wounded. About the same time Yount(32) of Panama City was operating on "shocked" patients with the aid of intravenous adrenaline infusions, and restorative agents tended to be called upon only in life-threatening situations. Ephedrine, the first practicable vasopressor, known in China for 5000 years, was introduced into Western medicine in 1923(33) and four years later Ockerblad and Dillon(34) reported using it to support the circulation during spinal anaesthesia. In 1928 Pitkin published his paper, "Controllable spinal anaesthesia" (35) in which he recommended injecting ephedrine routinely as a step towards making spinals safer. In the same issue of the *American Journal of Surgery* Koster(36) of New York expressed a different view. Describing spinal anaesthesia for operations above the diaphragm, he reported a study of arterial blood pressure levels in 500 patients and concluded that hypotension was generally of no consequence if the Trendelenburg position was used. If it was necessary to support the circulation he preferred intravenous saline

infusion to vasopressors. Koster's interpretation of the significance of hypotension during spinal anaesthesia was in line with that of the physiologists, Dale and Laidlaw(37), who had shown in 1919 that a fall in arterial blood pressure arising from arteriolar dilatation was relatively innocuous. Observations such as these were to lay the foundations of hypotensive anaesthesia. In 1948 Griffiths and Gillies (38) published their watershed paper on planned hypotension. By then the solution to muscle relaxation had been reached but surgeons and anaesthetists were becoming increasingly aware of another difficulty. With the widespread adoption of cyclopropane bleeding had become a more obvious problem; as Gillies was to point out(39), the introduction of curare had made matters worse by avoiding the necessity for deep general anaesthesia. Also, surgery was becoming more precise, typically in Learmonth's splanchnicectomies and lumbar sympathectomies for the treatment of essential hypertension. As is well known, Griffiths' and Gillies' solution was to combine "high" subarachnoid block with general anaesthesia: this had the advantages of ensuring adequate oxygenation, smoothing out operating conditions and relieving the wretchedness which so frequently accompanied spinal anaesthesia for abdominal surgery in the unanaesthetised patient. Their work put hypotension on a rational, planned basis. It was no longer simply a side-effect of spinal anaesthesia which had been described by the surgeon, Dickson Wright(40), in 1931, as something which was either welcomed or dreaded, depending on one's point of view. Further progress in hypotensive anaesthesia arose from the search for improved neuromuscular blocking agents. In 1949 decamethonium iodide (C10) was brought into clinical practice by Organe and his colleagues(41). Pentamethonium iodide (C5) was recommended as antidote, but it was soon evident that C5 made patients posture sensitive. This property was turned to advantage the following year when Armstrong Davison(42) of Newcastle, and Enderby(43) of East Grinstead, injected C5 to lower arterial blood pressure during anaesthesia. Thus, as Davison put it, could C5 be said to have "entered anaesthesia clinging to the skirts of its bigger sister, C10".

Enderby recorded his indebtedness to John Gillies for advice regarding acceptable blood pressure levels, and Edinburgh has since remained in the forefront of hypotensive anaesthesia.

In 1948 Gillies published a historical article in the "Pelican"(44), the nursing journal of the Edinburgh Royal Infirmary. He began with a touching quotation from "Rab and his Friends", in which Dr. John Brown described an operation by his famous chief, James Syme, at Minto House Hospital in Edinburgh in the decade before anaesthetics were introduced. Towards the end of the article Gillies stated that only in the last decade had progress in Anaesthesia been rapid enough to force recognition commensurate with its value and importance. He lived for almost another three decades and it is a pleasant thought that he saw this progress more than maintained.

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Peebles 1987



## NEWS FROM THE REGIONS

### WESTERN REGION

#### Glasgow

In the past year the Greater Glasgow Health Board has undergone a further re-organisation reducing the Administrative Units to five, three of which are based on geographical locations of hospitals, and two of which are based on services provided, e.g. paediatric and maternity services. The effects of this have yet to be fully felt but it seems as if the Divisions of Anaesthesia in the Royal Infirmary and Stobhill, and the Divisions in the Victoria Infirmary and Southern General Hospital, will have to undergo some form of amalgamation. The Western Infirmary is spared this trauma (or denied this great opportunity depending on one's point of view) as there is no separate Division of Anaesthesia in Gartnavel General Hospital.

On a less controversial note we were all pleased to learn that Professor Donald Campbell was awarded a C.B.E. in the Queen's Birthday Honours List. Furthermore, Professor Campbell has been appointed Dean of the Faculty of Medicine in the University of Glasgow and the administration of the University Department has been taken over by Dr.W.Fitch. When the pressures of academe mount up Professor Campbell has been known to walk down the hill to the Western Infirmary and keep his hand in with a little clinical anaesthesia.

The Western Infirmary has seen the retirements of three well-known members of staff: Dr.Donald Moir, Dr.Keith Holloway, to whom we all wish improved health, and Miss Sylvia Chadwick, Departmental Secretary for many years. Sylvia, as she was popularly known, was something of an institution and will be missed by all. Other retirements this year included Dr.R.Taylor and Dr.A.Laughland, Victoria Infirmary, and Dr.J.Munro, Royal Hospital for Sick Children. New Consultant appointments in Glasgow include Dr.R.Duckworth and Dr.J.Borthwick, both to the Institute of Neurological Sciences and the Western Infirmary, and Dr.G.Gillies to the Victoria Infirmary.

#### Lanarkshire

At Hairmyres Hospital Dr.Richards has resigned

and the Consultant post has been filled on a "shared basis" by two Consultants, Dr. Jean Lees and Dr. Ann Robertson from the 1st January, 1987.

Dr.McComb retired from Law Hospital on 31st December, 1987 and it is hoped to fill this Consultant vacancy before the end of January, 1988.

1987 has been an eventful year at Monklands D.G.H. being the 10th anniversary of the opening of the hospital and several celebration events were held. These included an Open Day in the hospital and a Medical Staff Association Dinner where the principal guest was Prof. E. McGirr who had been involved in the commissioning of the hospital. In addition, badges were given to staff who had been employed continuously in the hospital over the previous ten years in recognition of their service. Dr.V.Reid, one of the Consultant anaesthetists in Monklands, was the editor of an Anniversary book which was produced to commemorate the past ten years at the hospital, as well as outlining the hopes in the hospital for the future. This book had a wide distribution outwith Lanarkshire and was paid for by the local Unit Management.

On a sadder note, Dr. Sharif El Ghammrawi died suddenly on the 1st January, 1987 following a myocardial infarction. Dr. Ghammrawi was a Registrar at the hospital and had been in post in Monklands since 1978. Prior to that he had worked in Stobhill Hospital in Glasgow. He is survived by his wife who now lives in Renfrew and works as a physiotherapist in the Health Service.

#### Ayrshire

Dr. J. Currie and Dr. A. Michie have been appointed as Consultants during the year.

#### Paisley

Dr. T. Goudie has joined the Consultant ranks at the new Royal Alexandra Hospital

#### Vale of Leven

The Consultant vacancy here has been filled by Dr. J. Douglas



### **Forth Valley**

Dr. R. Casson has returned to Aberdeen from Stirling and been replaced by Dr. W. Mair.

**There have been no changes of note in Dumfries and Galloway or Falkirk.**

### **TAYSIDE**

1987 has been a relatively quiet year on Tayside. No changes have occurred in Consultant staffing, as we still await the replacement of Dr. Calum Davie in Perth.

At Senior Registrar level we welcomed Dr. Margaret Lonsdale who was promoted from the Registrar ranks. We were delighted by Dr. Neil Morton's award of the 1987 Travelling Fellowship from the Intensive Care Society. He has used this fellowship to study aspects of neonatal intensive care in various centres in North America. Dr. Rae Webster returned to Dundee after a year's Intensive Care Fellowship in Toronto.

During the year we lost a number of our most experienced registrars, Dr. Michael Wee to Copenhagen, Dr. Michael Lyew to Liverpool, Dr. Joan Lamb and Dr. Mary Elphinstone who left for Melbourne and then Montreal. New appointments were Dr. Gerrard Keenan, promoted from SHO, Dr. Angela Dawson from Melbourne, Dr. Diane Kellet from York and most recently Dr. Manthri from Darlington. Dr. Ann David spent 3 months attachment in Khartoum under the auspices of the British Council.

New SHO's appointed in August were Drs. Joyce Stuart and Jacqueline Donnelly.

Making up for the distant travels of our junior staff, our department played host to Dr. Hasan on clinical attachment financed by the Iraqi Government, and to Dr. Wang Fuhu from Nanjing, a result of contacts made by Dr. Bill Macrae on his recent Chinese tour.

Finally our congratulations go to Dr. Ian Lawson on being invited to give this year's Gillies Memorial Lecture. His lecture, "Relaxation - A Historical Perspective" was a fascinating account of the development of muscle relaxation and its part in anaesthetic practice, and was much appreciated by the large audience at the Society's Aberdeen meeting.

### **HIGHLAND REGION**

This year has been marked by retirement of long-serving members of staff. Dr. William Speirs has retired from Stornoway after working there almost single handed since 1964.

In Inverness Drs. Angus Martin and Alan Booth have retired, each having spent more than a quarter of a century in the department. We wish them all well in their retirement.

There is now a second consultant position in Wick which has been filled by Dr. Isobel MacKenzie who has come from Southampton. Dr. Bryony McEvedy is joining the Inverness department to fill the consultant vacancy there, from Cambridge.

Further staff changes are awaited (with controlled anxiety) pending publication of the "Shaw Report" on manpower.

### **EDINBURGH AND SOUTHEAST REGION**

In the Fife area Dr. Sonny Mowbray has been appointed consultant in the Victoria Hospital after his return from Hong Kong. The partial move of Bangour to the new District General Hospital at Livingston is imminent but the Plastic Surgery/Burns Unit is to stay at Bangour for the time being. Dr. Henry Turner has retired now and we wish him well.

In the north of Edinburgh developments continue in the Western General area. Now that Leith Hospital has closed as regards emergency and acute surgical services, anaesthetic sessions have been reallocated to the Western General and Eastern General. The new Intensive Care unit in the Western General is due to open next year with appropriate consultant cover. Among the personnel there Dr. David Wright is welcome back from his time in Australia and Jim Jenkinson is congratulated on his election to the Council of the Intractable Pain Society.

On the south side of the town the gradual refurbishment of the Royal Infirmary has meant moving the Urology Department to the Deaconess Hospital and Dr. Colette Clark, Senior Registrar in Glasgow, has been appointed to consultant status therein. Dr. John Conlon, returned to Scotland from world travels, has been filling this post as locum and we wish him well in his new post in Hull. The obstetric anaesthetists have reorganised their

roster with Jimmy Wison thankfully restored to full health, and Dr. Ann Whitfield now full-time with the retiral of Dr. Barbara Leeming. Amongst the junior staff, Dr. Bill McCulloch returned from Oman and is now a consultant in Coventry, Dr. Dave Simpson is now consultant in the Sick Children's Hospital, Edinburgh. Registrars and senior registrars abroad include Ian Armstrong (SR) in Adelaide, and Donald Galloway and Simon Rowbotham (Registrars) in Hong Kong. Congratulations to Alistair Lee (SR) for winning the Scottish Society Prize. We welcome several new senior registrars, namely Drs. Aldridge, Phillips, Lew, Pugh and Andy Winters from Glasgow.

### GRAMPIAN

In June 1987 Dr. R.G. Milne retired from our department. Ronnie, who came to Aberdeen in 1957 as an S.R. from Leeds, will be missed by his many colleagues and friends. Never a one for wasting time, he will not find it difficult to fill his spare moments. Over the past ten years he has become a keen and competent skier and intends to spend much of the year living near his daughter and grandchildren in Austria. Ronnie now lists his hobbies as drinking German beer, skiing and babysitting - we wish him and his wife Audrey a long and happy retiral.

Two new Consultants joined our Department: in September Dr. A. Sheikh from Kirkcaldy and in October Dr. R. Casson from Stirling. There have been a number of changes in our junior ranks. Dr. Douglas McLeod has taken up a Consultant's post in Melbourne, Australia with the Senior Registrar vacancy being filled by Dr. Graham Johnston.

Dr. A. Ross was married and now lives in Canada while Drs. Mike Brockway and Susan Geddes have taken up registrar posts with Glasgow Royal and Western Infirmaries. Drs. Deppa Singh and Alison Symon followed their husbands to England.

Two new Registrars were appointed. Drs. Sunil Arora and Paul Martin, while Drs. Allan Cyna and Rita Dua were promoted from the S.H.O. grade.

New S.H.O.'s starting in August were Drs. James Park, Andrew Craze, Ruth Cruickshank, Jan Anderson, Sandy Hunter and David Levy.

Finally the department wish to thank all those members of the Society who supported the Annual Scientific Meeting held in Aberdeen.

### GOLF OUTING

The golf outing took place on the 11th June (the day of the General Election) and 19 golfers pitted their skill against the hazards of Scots-craig Golf Club, Tayport. Our thanks are due to Ian Gray and Farquar Hamilton for organising the venue which proved most acceptable, with an individual stableford competition played in the morning, and a two-ball foursome match of East versus West in the afternoon. Once again we are indebted to Alistair McKenzie, the past President, for capturing the atmosphere of the event on video.

In the course of the day several members were noted to be veering consistently to the right and at a conservative estimate they were probably in the majority. A motley number were labouring with hooked or pulled shots and only a very few were straight down the middle although a liberal number of these favoured a left of centre shot. Some Decent People seemed to be unsure of which direction to aim for! One prestigious member was heard to comment that on the greens the ball just seemed to go on and on and on!

However there was a unanimous vote that the day had been a great success, and a greater turnout could be expected on the next occasion which will be on the 30th June 1988 at Buchanan Castle Golf Club, Drymen. The winner of the morning stableford was Robin Allison who was presented with the Scott trophy by the Vice-President, Alick Reid, as the President had been unfortunately delayed. Previous winner Sandy Buchan was second and Greg Imray third. The afternoon East v West needle match ended in an honourable draw.





**NORTH EAST OF SCOTLAND  
SOCIETY OF ANESTHETISTS**

Meetings are to be held at 7.30 for 8 p.m. in Stracathro Hospital, Brechin, unless other-wise notified.

1987

Thursday, 22nd October Stracathro

Some cases of anaesthetic litigation

Mr J. MacDonald, Mr R. Pringle

Thursday, 26th November Stracathro

Aspects of treatment for near drowning

Dr A. Simcock

1988

Thursday, 3rd March Stracathro

Registrars' Prize Papers

Thursday, 14th April RAF Leuchars

Visit to Royal Air Force Leuchars

Thursday, 19th May Stracathro

Annual General Meeting and

Presidential Address

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

1987

Friday, October 30th

Combined meeting with Edinburgh and East of Scotland Society of Anaesthetists in Glasgow.

Professor Alan Watson, Professor of Forensic Medicine, University of Glasgow.

Tuesday, November 24th

Professor J. Gareth Jones, University of Leeds.

"Evaluating function in the anaesthetized brain".

1988

Tuesday, January 19th

Members' Night - presented by Members of the Division of Anaesthesia.

Western Infirmary, Glasgow.

Thursday, February 25th

Professor Graham Smith, University of Leicester.

"Sympathoadrenal responses in the peri-operative period".

Wednesday, March 23rd

Presidential Address - Dr A. G. Macdonald.

"It could happen again . . ."

Thursday, April 14th

Annual General Meeting

Wednesday, May 18th

Annual Golf Outing - Hagg's Castle Golf Course.

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

Notice of each meeting will be sent to members.

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

1987

Tuesday, October 6th

Professor A.A. Calder, Edinburgh University, Dept. of Obstetrics & Gynaecology.

"Attitudes in Labour".

Friday, October 30th

Professor Alan Watson, University of Glasgow, Dept. of Forensic Medicine.

"Dealing with our legal friends".

Joint meeting with Glasgow and West of Scotland Society.

Royal College of Physicians, St. Vincent Street, Glasgow.

Tuesday, November 10th

Professor Gareth Jones, University of Leeds.

"How do we know our patient is asleep".

Tuesday, December 8th

Dr Tom Taylor, London Hospital.

"Medico-legal aspects of anaesthesia".

1988

Tuesday, January 5th

Dr Peter Morris, Manchester Children's Hospital.

"You are not yet a 'little man' my son Halothane anaesthesia in children".

Tuesday, February 2nd

Dr Brian Slawson

Presidential Address.

Tuesday, March 1st

Members' Night.

Saturday, March 19th

Annual Dinner. University Union, Teviot Row House. 7.30 for 8 p.m.

Tuesday, May 3rd

Annual General Meeting.

R.C.S.E. Library, Nicolson Square.

7 for 7.30 p.m.

Unless otherwise stated, meetings are 7.30 for 8 p.m. in the Main Hall, Royal College of Surgeons, Nicolson Square, Edinburgh.

A bus to the Glasgow meeting will leave the Royal Infirmary, Edinburgh at 5 p.m.

Members are reminded that submissions for the Associate Members' Prize should be in the hands of the Honorary Secretary before Christmas 1988.



## Registrar's Prize

The Society annually awards a prize of £150 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 £75 or a third of £50 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/Her 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 the 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 1987 was won by Dr A Lee of Royal Infirmary, Edinburgh for his paper entitled "Postoperative Analgesia by Continuous Epidural Infusion of Bupivacaine and Diamorphine".

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