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FRONTIERS OF ANAESTHESIOLOGY

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Whenever an Annual Meeting of the Australian Society of Anaesthetists is held in Hobart our thoughts naturally turn to the past, as it was here thirty-three years ago that this Society was founded by a select group of anaesthetists - G. Brown, the chairman, G. Kaye, G. L. Lillies, G. Troup, G. Duncombe, H. J. Daly, and W.I.T. Hotten. These men could review with satisfaction the outstanding advances made during these past thirty-three years, both in the specialty of anaesthesiology and in the growth of our Society. The Australian Society of Anaesthetists has grown steadily in numbers - from 34 in 1935 to 560 today. There have also been considerable technical developments. Even as Gilbert Brown and his colleagues were deliberating on the formation of this Society, Lundy (1935) was making the first clinical trials of thiopentone in the United States of America. Cyclopropane had just been introduced (Waters 1933), and trichlorethylene was about to appear (Striker 1935). In the early nineteen forties curare was introduced into anaesthesia by Griffith and Johnson (1942), and the concept of assisted respiration was developed. The techniques of hypothermia and cardiac bypass were described by a number of workers between 1950 and 1952, and halothane was introduced into clinical anaesthesia by Johnstone (1956) and Bryce-Smith and O'Brien (1956).

This list of achievements is impressive but it should be observed that all took place between the years of 1934 and 1956. Admittedly during the past 10 years there has been much progress in the understanding of the basic sciences related to anaesthesia-physiics, physiology, biochemistry, and pharmacology. But there have been few dramatic advances in these 10 years: at present our specialty appears to be in a static phase.

Today I venture to look to the future and discuss what we as a Society and as individuals must do to enhance the status of anaesthesiology as a medical specialty, using the following four headings.

1. Academic Anaesthesiology
2. The Australian Society of Anaesthetists
3. The Status of Anaesthetic Practice
4. New Horizons for Anaesthesiology

ACADEMIC ANAESTHESIOLOGY

The teaching of anaesthesia must be expanded. At present we have only one Professorial Chair of Anaesthesia in Australia and more must be established. However, in doing so it is essential that we do not agree to having associate chairs attached to a department of Surgery: we must insist on fully autonomous University Departments of Anaesthesia. It is to be hoped that the Faculty of Anaesthetists of the Royal Australian College of Surgeons will accelerate their plans for a Professor of Anaesthetics in the College.

The teaching of anaesthesia involves a number of different groups, including medical undergraduates, hospital residents, specialist anaesthesiologists and general practitioners.

(a) Medical Undergraduates.

Instruction to undergraduate students has rightly evolved to a stage where little if any technical training is given. Teaching should be concentrated mainly on basic principles of anaesthesia with much more instruction being given on intensive care. No medical graduate should be considered competent to administer anaesthetics without post-graduate training. However, it is important for

teachers to realize that interest in anaesthesiology must be stimulated in students to maintain recruitment to the specialty.

(b) Hospital Residents.

Most residents in teaching hospitals receive a brief period of instruction in the simple techniques of anaesthesia and occasionally in intensive care. Residents in country hospitals may not be so fortunate although this position will improve as more trained anaesthesiologists are attracted to the larger country towns. It is expected that residents who plan to undertake general practice will come to appreciate that training in anaesthetic methods and intensive care is as essential as training in general medicine, pediatrics or obstetrics. Hospitals on their part must be willing and able to provide a minimum of three months resident training in anaesthesia suitable for the conditions of general practice. Very few hospitals in Australia can do this at present.

(c) Specialist Anaesthesiologists.

This is the best organised aspect of anaesthetic training in Australia; the Faculty of Anaesthetists of the Royal Australasian College of Surgeons, University Departments of Anaesthesia and Hospital Departments of Anaesthetics all combine to provide expert teaching of future specialists. However, with the imminent development of new concepts of the role of anaesthesiologists in Medicine, which I shall discuss shortly, the teaching and examination system will require radical alteration.

(d) General Practitioners.

Instruction for general practitioners is our chief problem in education in Anaesthesia. Nobody knows just how great this problem is.

Vague statements are made by responsible persons about the "Vast Australian Outback" where anaesthetics must be administered under primitive conditions - it is an inappropriate suggestion, although made by many, that all our undergraduate teaching should be geared to this level. Efficient aerial transport and properly equipped base hospitals have meant that even in the most remote areas patients are not more than a few hours away from proper facilities and trained specialists, and only the simplest surgical and anaesthetic procedures need to be performed locally.

At present it is not possible for specialist anaesthesiologists to give all anaesthetics, even in the major cities. However, I suggest that we can improve the less than satisfactory situation in Australia in the following ways:-

- (i) A proper survey should be undertaken by our Society, in conjunction with the College of General Practitioners, to assess the size of the problem, particularly in regard to the country areas. Such a survey has been contemplated - but not performed - by the Faculty of Anaesthetists of the Royal Australasian College of Surgeons; I feel that our Society, with its large membership and wider ramifications is the proper body to conduct such a survey.
- (ii) That there should be more resident training posts with emphasis on those anaesthetic problems likely to be met in general practice.
- (iii) That the metropolitan teaching hospitals and the larger base hospitals should provide adequate courses of instruction for general practitioners with preference being given to country doctors.

- (iv) That specialist anaesthesiologists be encouraged to work in large country areas and that it be their responsibility to teach general practitioners in their area and also to ensure that all anaesthesiologists engaged by base hospitals have reached a specified degree of competence.
- (v) That more interest be taken in the transport by road and air of sick patients to centralized hospitals. Anaesthesiologists should take part in the necessary intensive care during transport just as is done in the so called "flying squads" in some parts of England, or in Denmark where all ambulance services are directed by anaesthesiologists.
- (vi) That general practitioners to be encouraged to realize that, if in the course of their practice it is necessary to administer anaesthetics, it is their obligation to seek training in current methods.
- (vii) That the Australian Society of Anaesthetists undertake more teaching programmes. At present we sponsor the annual visit of an overseas visitor who lectures in the capital cities of all states; these lectures prove most stimulating although of benefit mainly to the specialists. We as a Society have very many highly qualified and internationally recognised anaesthesiologists and we should be sending them regularly interstate and into country areas to conduct weekend courses. Our Queensland colleagues are particularly active in arranging post graduate anaesthetic meetings and we should follow their example on an Australia wide basis.

THE AUSTRALIAN SOCIETY OF ANAESTHETISTS

In the next decade this Society will have to reconsider its classes of membership. We may follow the example of some other countries and have two types of membership, restricting full membership to anaesthesiologists with post graduate degrees and giving associate membership to doctors who are preparing to enter the specialty or who profess a special interest in the subject. In this way we will assume much greater political strength and better status amongst other medical societies.

I am convinced that our Society is essential. We are an independent body and among our members we count most anaesthetists in Australia. The Faculty of Anaesthetists of the Royal Australasian College of Surgeons represents many but by no means all of the specialist anaesthetists, and is not an independent body. This year I attended, as your representative, the inaugural ceremony of the Australasian College of Dermatologists which has become a separate College independent of the Royal Australasian College of Physicians. The formation of this College was due largely to the determination and persistence of its first president, Dr. John Belisario. We too from our ranks must find a leader who will strive to end the present phase where a Faculty of Anaesthetists is part of the Royal Australasian College of Surgeons. We must support such a leader in a determined effort to form our own College of Anaesthesiologists.

THE STATUS OF ANAESTHETIC PRACTICE

Conditions are not ideal in the private practice of anaesthesiology in Australia. Anaesthesiology is the only specialty where patients are referred for management without adequate history, X-rays or bio-chemical tests. Usually the anaesthesiologist is "hired" by the surgeon's receptionist or

nurse and frequently the only information available is a note in brackets after the patient's name stating a brief diagnosis, for example "diabetic", "anaemia" or "augioneurotic oedema of the larynx".

The patient is usually seen by the anaesthesiologists in a hurried preoperative visit when a short history is taken and a rapid examination is made, and a brief description of the next day's procedure is given. Some patients, particularly those unfortunate enough to suffer awareness during anaesthesia, think that anaesthesiologists give an injection of thiopentone and depart for their next assignment leaving the surgeon to complete the operation. Such is our image with the public that recently, during the Israel Arab crisis, it was stated in the press that the most urgently required medical persons for Israel were "doctors, nurses and anaesthetists".

We should insist that patients are properly referred to us by letter and wherever possible we should see patients in our rooms where they can be examined at leisure so that laboratory tests can be arranged and drug therapy can be modified as necessary. Such an arrangement only requires the setting aside of one or two half days per week for seeing patients and involves considerably less expenditure of time than the present unsatisfactory system of preoperative visits. That it is possible is proven by experience in West Australia where some specialist anaesthesiologists function in this way.

Private patients employing specialised medical services have little concept of the exact skills for which they are paying, and this is particularly true of anaesthetic services. Last year our past president, Dr. Brian Dwyer, compiled an excellent brochure explaining in lay terms the functions of the expert anaesthesiologist. At present advice is being obtained as to possible medico-legal implications involved in using such a pamphlet, but

it is to be hoped that some such method can be employed to explain to patients the standard of anaesthetic care they can expect.

Just as we must improve our public image so also must we assert ourselves in the operating theatre and assume equal responsibility with the surgeon, and set adequate standards for operating theatre facilities, nursing assistance and equipment.

NEW HORIZONS FOR ANAESTHESIOLOGY; INTENSIVE CARE AND
COMPUTER CONTROLLED ANAESTHESIA

New drugs will be manufactured and better equipment will be produced - but where are the new horizons for anaesthesiologists? I predict that they will be found less in the operating theatre than in areas which can be broadly classified as intensive therapy.

Intensive therapy units have already broadened our areas of responsibility to include neonatal resuscitation, the many types of respiratory insufficiency and the fuller understanding of the maintenance of vital functions in acute illnesses. Anaesthesiologists have two roles in intensive therapy. The first is to act as a physician for acute illnesses. The administration of anaesthetics for operations should be just one aspect of this work. Their other function is to co-ordinate the activities of the various medical specialists concerned in treating desperately sick patients. It should be apparent that a properly trained anaesthesiologist is best qualified to direct an intensive therapy unit.

Future generations will acknowledge that the electronic computer represents one of the greatest scientific achievements of this century. We must endeavour to make anaesthesiology the first of the medical sciences that

is fully automated by computer control. Computers are used in medicine today for the storage, retrieval and analysis of clinical data. There is no problem in designing anaesthetic record forms which can be used for input to the computer and already computers have been employed in the National Halothane Study in the United States of America to analyse a large series of case records (National Halothane Study, 1966). There are limitless possibilities for using computers for the evaluation of drugs and techniques in the practice of anaesthesiology (Belville and Hara, 1966). Advances in computer techniques have resulted in the development of relatively inexpensive digital and analogue computers which will process data through their connections with a large central computer, such as the I. B. M. 360-50, which could be located several miles away. Efforts are being directed at present towards the development of small digital computers with which doctors can communicate directly - such computers would then become standard equipment at the bedside or in the operating theatre (Forrest and Belville, 1967).

This leads to the second phase - computer assisted anaesthesia. Computers are already being used for the continuous monitoring of the E. C. G. (Caceres 1963) with the normal preoperative E. C. G. being shown simultaneously. If the values fall within normal limits established for the patient, the information is not processed. However, if it falls outside these limits sampling occurs every milli-second and the entire cardiogram is processed. On line monitoring of the E. C. G. will be the first step in the computer administration of anaesthetics. Monitoring of other indices e.g. respiratory measurements, blood flow, cardiac output, pH, and carbon dioxide excretion will follow and the computers will be programmed to call attention of the anaesthesiologist to departures from normal or to inadequate data: i.e. computer assisted anaesthesia.

The final stage in automation will be computer controlled anaesthesia. Once the computer is given sufficient information collected from the analysis of our knowledge and experience of the past 30 years, it will be able to give virtually faultless instructions as to the conduct of anaesthesia and thus will be able to improve on our present ability to administer anaesthetics. Once the machine can give these instructions the anaesthesiologist can stay outside the operating theatre, leaving technical details of anaesthetic administration to trained assistants. Decisions on the administration of drugs and the maintenance of physiological conditions will be automated and the anaesthesiologist will be the physician supervising the entire procedure. With the assistance of computers it will be possible to supervise several anaesthetics at once just as at present several patients with coronary occlusion can be supervised simultaneously in coronary care units.

In conclusion: to make the next 30 years as rewarding as those just past, we must enhance our status, both as a Society and as individual anaesthesiologists. The expansion of teaching must include the formation of new professorial departments and more post-graduate training for all doctors who administer anaesthetics.

In private practice of anaesthesiology we must improve our public image and also assume equal responsibilities with our surgical colleagues.

Our Society will need to review its classifications for admission to membership to differentiate between specialists and non specialists. We must press strongly for a College of Anaesthesiologists.

Finally we must emerge from the stage of working only within operating theatres and having interest only in the technical procedures of anaesthetic

administration. Our activities in the field of intensive therapy must expand and we must pioneer the use, in hospitals, of automated anaesthesia by electronic computers.

I close by quoting from Forrest and Belville (1967). "It is clear that the question is not whether computer controlled anaesthesia will ever be a reality but when it will be a reality. There will be a time when the reality will no longer be delayed by technological considerations. With the advent of time sharing of computers, financial considerations will no longer be deterring factors. The shortage of anaesthetists will hasten it.

Thus the administration of anaesthesia may well be the first practice of medicine to be automated. Will anaesthetists as a specialty disappear? Perhaps, in the narrow sense of the word they will, but a new physician will emerge."