RES MEDICA
Journal of the Royal Medical Society

Contents

ISSN: 2051-7580 (Online) ISSN: 0482-3206 (Print)
Res Medica is published by the Royal Medical Society, 5/5 Bristo Square, Edinburgh, EH8 9AL

Res Medica, 1981
doi:10.2218/resmedica.v0i0.1981

1981

Res Medica

Contents

THE JOURNAL OF
THE ROYAL MEDICAL SOCIETY

PLEASE HELP THOSE WHO SPECIALISE IN HELPING YOU.

Surgery saves life. It brings hope and relieves pain and suffering. Most of us, sooner or later, find that we, or those dearest to us, require the help of a surgeon and we expect the highest standards.

But the surgeon's skill does not happen as by magic. It is the result of long and painstaking training. The Royal College of Surgeons of Edinburgh, with nearly five centuries of tradition and experience, is dedicated to provide this education and to maintain the highest professional standards.

The College, which is totally independent, is appealing for funds to improve and expand its educational facilities and to provide residential accommodation for surgeons in training.

Will YOU help those who specialise in helping you?

Please send your contribution to the Appeal Chairman, using the form and the address below.

(tear here)

The Royal College of Surgeons of Edinburgh

Appeal Fund. Donation.

To: James A Ross MBE FRCSEd
Appeal Chairman
The Royal College of Surgeons of Edinburgh
Nicolson Street
Edinburgh EH8 9DW

I enclose cheque/bank transfer/money order (No) for the sum of £ as a donation to the Appeal Fund of the Royal College of Surgeons of Edinburgh.

Name (Block capitals please)_____

Address_____

_____

Signature_____ Date_____

CONTENTS

You'll get on better with The Royal Bank.

Often one of the main drawbacks to setting up your own practice, or buying a share in an existing practice, can be lack of money.

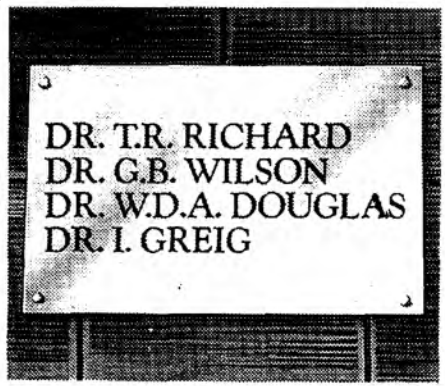
Which is perhaps where we can help.

The Royal Bank is able to provide loans for these purposes to existing customers or new customers, up to a normal maximum of £20,000, although sums in excess of this figure would be considered.

Loans are available for periods up to 10 years, with repayment made by progressive reduction at agreed intervals, and backed by suitable life cover. Alternatively, the Bank may accept a suitable endowment policy maturing at the end of the loan term.

In addition, personal health insurance cover is usually required.

If you are thinking of your own practice, perhaps we can help turn it into reality. For further information and advice about loans to the professions, please contact the Manager of your local Royal Bank Branch, or ask for our booklet 'Professional Practice Finance'.



We put up the money, you put up the plate.

The Royal Bank

RES MEDICA

Journal of the Royal Medical Society

ISSN 0482-3206

Editor
GRAEME DUNCAN

OFFICE BEARERS OF THE SOCIETY 1980/81

For the 244th Session

Senior President	CHRISTOPHER INGAMELLS
1st Junior President	ALEX HAMILTON
2nd Junior President	BRIAN MONTGOMERY
3rd Junior President	HAMISH McRITCHIE
Senior Secretary	DOROTHY RUSSELL
Junior Secretary	LYN McLARTY
Convenor of the Business Committee	ALASTAIR McKINLAY
Convenor of the Publicity Committee	RODERICK ELLIOTT
Convenor of the House Committee	SHONA ROSS
Convenor of the Library Committee	ELIZABETH BOYTER
Convenor of the Museum Committee	SANDRA BROWN
Convenor of the Entertainments Committee	LIZBETH JORDAN
Treasurer	IAIN MacLAREN, FRCS

The penny black!

Some other banks demand a continuous balance of £50 in your personal current account before this service is free. Others go as high as £100 minimum. Fall below that and you may pay for your cheques and standing orders, even though your account is still in the black.

Which may make you see red. Why should you pay for using your own money?

Why indeed. And that is how the Clydesdale Bank sees it. With a Clydesdale Bank personal current account you can use all your money down to the last penny and there's still no service charge.

That makes it somewhat rare and very valuable.

Which is why it's the bank that's nearest to you and your needs.

Clydesdale Bank

The bank that's nearest to you and your needs.

EDITORIAL

Throughout its history the Royal Medical Society has striven to be a forum for debate, allowing the presentation of new and challenging ideas as well as critically reviewing the old. It is hoped that RES MEDICA embodies these principles in a balanced manner.

Medicine and the media have come to blows on many subjects in the past, but the last year was notorious in every respect. Technological wizardry wielded by some misinformed pedant brought visions of death, disorder and disability into peoples' homes. The controversy surrounding brain death was damaging enough to both patients and doctors, but this was followed by a series of documentaries about decisions on whether to allow 'severely' handicapped neonates to live. One hopes that the current trial of a paediatrician in England will not set a precedent. The attitudes towards handicapped children have changed dramatically in the last few years, and Dr. Raeburn in his article *"Active Management in Serious Genetic Disorders"* should provoke some fresh thoughts on patients previously considered to be without hope.

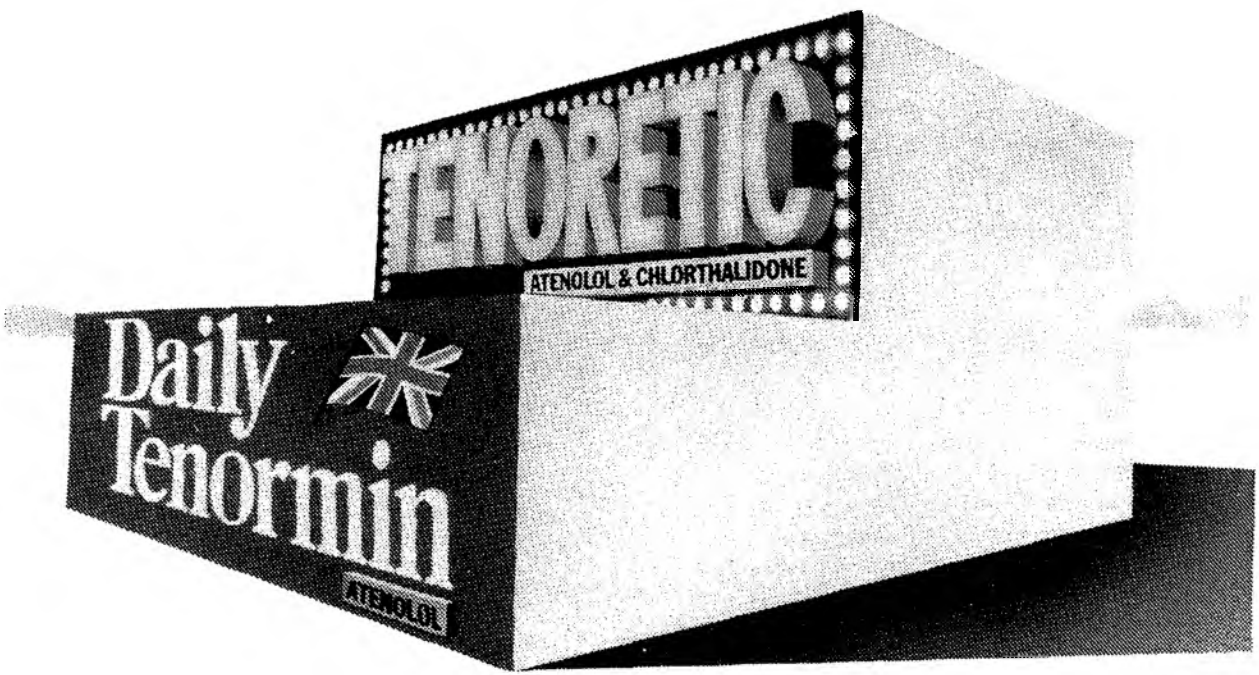
Civil disorder is only too well known to all of us and the distressing increase in apparently motiveless brutality in our society — particularly towards the elderly — makes Prof. MacLennan's article *"Muggings and Assault"* cogent reading.

The disabled suffer not only from pain but also immobility in many cases and the advances in joint prostheses offer hope to those with degenerative joint disease especially. These advances have been paralleled with better understanding of clinical methods and investigations. Mr. Macnicol admirably outlines these in *"The Diagnosis of Knee Pain"*.

In each issue of RES MEDICA one of the dissertations read before the Society is chosen for publication. Mr. McKinlay's contribution comprehensively covers the arguments over the role of trimethoprim used alone (particularly for urinary infections), and in conclusion offers some practical advice.

Computed tomography has secured an important place in imaging for the future, and Prof. Best looks back on its development in the **Comments and Reflections** section of the journal. This section also includes an interesting perspective of the famous 19th century Edinburgh surgeon, James Syme, ably written by Dr. Eastwood. The new medical curriculum continues to be a topic of much debate in Edinburgh and Prof. Robson now replies to Hamish Maclaren's criticisms set out in last year's issue. Rob Buckman ('Pink Medicine Show') addressed the first meeting of the 244th Session (1980/81) of the Society, to everyone's amusement, and provides the light entertainment in the **Miscellanea** section, completing this year's issue.

Logical steps in the treatment of hypertension



Full prescribing information is available on request to the Company.
Stuart Pharmaceuticals Limited, Carr House, Carrs Road, Cheadle, Cheshire SK8 2EG

STUART 'Tenormin' and 'Tenoretic' are trademarks

COMMENTS & REFLECTIONS

THE EDINBURGH MEDICAL CURRICULUM A PERSONAL VIEW

James S. Robson, MD, FRCPE
Professor of Medicine, University of Edinburgh

Students who are now studying Medicine in Edinburgh are obviously unable to compare the current curricular arrangements with those that preceded the changes which took place in 1977. It may therefore be useful to recall the major defects of the previous medical course as they were identified in the Fourth Report of the Review Committee set up by Faculty in 1973. The purpose in doing so is not so much to indulge in nostalgia but more to try to assess the extent to which the present curriculum has succeeded in remedying the flaws that were then seen. It may also help the new generation of students to see the direction in which future changes may be desirable. The main defects of the former curriculum that were reported by the Committee were as follows:

The absence of educational objectives at all levels.

A curricular structure that makes only a limited allowance for varying interests, aptitudes and rates of learning of different students.

Overcrowding of the curriculum and overloading of factual detail consequent upon departmental autonomy in curricular affairs.

Failure of the students who lack clinical experience to appreciate the relevance of a great deal of pre-clinical teaching.

Failure to reinforce science-based knowledge in the context of clinical problems in later years.

Over-use of the teaching hospital as the base for clinical teaching.

Over-dependence on the use of the lecture as an all-purpose teaching method.

The very limited use of teaching methods which develop self-reliant learning.

The teaching and consequent examination of subjects in isolation and with over-emphasis on factual recall.

The neglect of continuing student assessment with its possibility of student guidance at a time appropriate for further remedial study.

The Committee's final and Fifth Report set out a model curriculum which tried to take account of these deficiences and remedy them. Perhaps inevitably, the proposals were seen by Faculty as a whole as being too far-reaching. Counter proposals of a more modest nature were made and the present course emerged from the resulting compromise.

Some original major recommendations survived the blood bath. Notably the proposal for direct entry for well qualified Scottish students to a five-year course (apart from a short bridging course in chemistry) was accepted and an advisory Undergraduate Medical Education Committee (UMEC) and its daughter Phase Committees were set up and have proved useful forums in which open discussion of many curricular problems has since taken place. Sensibly used, these bodies should constitute an important means by which further improvements are made, as their members are in a position to see the curriculum from a non-departmental point of view and appreciate the checks and balances which influence and limit policies. A reversion to complete departmental autonomy in which individual departments defend their own holes and corners would signal the

re-appearance of a tyrannical syndictylism and must be resisted.

In so far as the lack of objectives is concerned, some see the statements of the overall goals of the five-year curriuclum as set out in the University Calendar as being self-evident and superfluous truisms. On the other hand, in an organisation so complex as a medical school, it is an essential safeguard for its direction and purpose to be stated in unambiguous terms. The current goals reflect a comprehensive view of education in the health sciences and in health care and indicate the kind of student Faculty wishes to see graduate. They help to ensure that the courses provided are properly related to the needs of society, and that a balance is kept between science-based learning and the acquisition of the skills and attitudes needed to care for the patient as a whole, both in hospital and in the community. At the very least, they provide a reference standard against which to appeal should any narrow sectional interest become too dominant. The fact that for the previous 250 years the medical school did not define its objectives and apparently did well, is no excuse for not taking all steps to do better.

It is gratifying to find that the majority of students who responded to a questionnaire concerning the value or otherwise of the detailed objectives of Phase III found them useful. I believe course objectives need to be set out in considerable detail and should constitute a form of check-list.

Formerly the student and staff used a comprehensive series of lectures to indicate the content of courses and examinations and this practice, more than any other, led to the overuse of the large group lecture as a teaching mode in Edinburgh and elsewhere in Scotland. The restriction of the number of lectures raises the need for an alternative guide to what is relevant course material. Furthermore its provision should free the lecturer in the future from the temptation to "cover" the subject, though this lesson still needs to be learned by many teachers. Precise objectives have yet to be written for Phases I and II and some of the components in Phase III need to be elaborated further. Some of these are under way, but will only come to fruition by continued pressure and demand. While overcrowding of factual detail in lectures is still possible, it is less likely to occur than hitherto. The situation could also be improved if UMEC exerted a greater influence over the actual content of professional examinations than it has done up to now.

There has been a modest advance in accommodating different learning rates within the standard curriculum by using the device of guided electives for individual students who have not achieved a satisfactory level of performance in clinical work. Regrettably, there are no comparable arrangements for this in the earlier Phases, though an elective period borrowed from Phase III can be made available to those who need a second attempt at the third Professional Examination.

Continuing assessment of student performance remains patchy, but performance is monitored throughout most of the curriculum and constructive advice can and is given to those who appear to be in difficulty. The most important change in the pattern of professional examinations was made in Phase III. In place of a traditional, comprehensive, end of course final examination the policy of covering the clinical ground in four separate stages has resulted in improved learning as well as providing the opportunity to resit individual parts of the final clinical examination within a standard five-year course. Those who disagree with this pattern take the view that medicine is a single comprehensive subject and that there is educational benefit in a single, end of course final examination covering all main clinical disciplines. In my view the burden on the student was enormous and its educational influence baleful and destructive. Few who previously served as examiners at this symbolic maturity rite in which overwrought students wrestled with virtually the whole spectrum of clinical practice, with the possibility of failing at the end of a six year course without the opportunity for retrieval within the standard course can seriously wish to return to it. Separation of the major clinical disciplines both for learning and assessment allow the student to think about one discipline and those closely related to it without distraction over a substantial period of time. Equally importantly, it allows the student to gain insight into the science-based aspects of the clinical subject under study, an opportunity that was largely denied him in the past and one that would be impossible to

retain should more traditional views prevail. There has thus been a partial restoration of science-based learning in the clinical years, though I believe that this has not gone far enough. Where comparison has been made in the performance in medicine with the previous curriculum the level of attainment has been consistently higher. The performance of students who sit medicine early in Phase III as distinct from later in the course is not significantly different.

Grouping of selected clinical subjects together in this way also compels departments concerned to think clearly what are the undergraduate objectives of their clinical specialties.

When these are defined precisely, overlap between the major branches of clinical work is surprisingly small, and certainly itself does not justify a return to a single conglomerate end of course examination. It can be argued, however, that there is significant overlap between clinical medicine and general surgery. In so far as this is true, there is not and never was a case for examining the student on these common aspects twice, once in medicine and again in surgery, as occurred, for example in the old curriculum. It would be better if the course and the associated examination in undergraduate surgery confined itself to those aspects that were distinctively surgical – namely trauma, burns, herniae, vascular disorders, abdominal emergencies, etc., and orthopaedics – with disorders of the breast being conducted as a part of reproductive medicine. Time could then be found in the surgical attachments for much needed experience in accident and emergency, and for the opportunity for extended practical work with wounds and fractures. Topics like cholecystitis, peptic ulceration, diverticular disease and the like are well covered in the medical attachments of Phase III and should not sit uneasily in two different teaching blocks nor be subject to double professional assessments. The fact that a minority of patients with these complaints are treated ultimately surgically is not a valid reason for including them in an undergraduate surgical course, however long established this practice has been in Britain.

It is a matter for regret that the introduction of the 1977 curriculum did not lead to a greater increase in methods of self-reliant learning. Nevertheless, while most of the first five terms are devoted to Anatomy, Physiology, Biochemistry and Pharmacology, the teaching of which follows a conventional pattern, some of the classes in Behavioural Sciences and Clinical Correlation exercises use Problem Based Learning Projects. It is important for students and staff to gain some experience in the use of a method of learning which is believed to encourage the student himself to analyse problems by initiating and exploring appropriate relevant areas of basic knowledge. Three cycles of such projects have now been conducted and a look at the topics studied encourages the view that Edinburgh does not take a narrow or parochial view of medical education. Their catholic nature has included a study of hypothermia in the community, population control, the taking of drugs in pregnancy, to the cognitive function and cerebral blood supply. These projects are enjoyed and educationally rewarding, not least in the climax of their presentation by student groups in the Royal Medical Society. There is little doubt that opportunity for independent study should be further developed. It has to be remembered that while the student of medicine needs to know certain facts, his later professional life does not consist in regurgitating them, nor is he, as a doctor, often in a position to choose the problem he would like to solve. Patients are presented to him as unknowns and his education should equip him with the capacities to deal with this reality. Attitudes fostered by a school classroom approach to teaching and learning do not meet this need. Perhaps the greatest criticism of the present curriculum stems from the limited opportunity for clinical experience in the early years. Thus in the teaching of the medical sciences the "Learn and Forget" theory of medical education still largely prevails. Earlier attachments to clinical units (e.g. in Phase I) may be possible in the future, though these could raise practical difficulties of over-teaching on hospital patients. Encroachment on the time available for pre-clinical sciences for clinical work will, of course, be resisted. However, as a good case can also be made for increasing the opportunity for science-based learning in the later years, UMEC should not be afraid to engage in the wheeling and dealing of curricular time that may be necessary in order to achieve a curriculum in which science-based learning and clinical experience become still more concurrent than they are now. ●●

RAB AND HIS FRIENDS

M.A. Eastwood, MSc, FRCPEd
Consultant Gastroenterologist
Western General Hospital, Edinburgh

It is not unreasonable to see why medical textbooks come and go. The eternal truths found in anatomy can well be translated from edition to edition, hence the popularity and survival of Cunningham's and Jamieson's textbooks. It is not unexpected that the great textbooks of past such as Thomson and Myles Operative Surgery or Bennett's Textbook of Physiology should have fallen by the way.

A few writings from the past, however, are rarely read and this is to be regretted. One such is John Brown's Horae Subsecivae. Much of the work provides somewhat ponderous reading for modern readers who have turned away from Scott to Hemingway to Le Carré. Such readers are hardly likely to relish verbose Victorian writers. However, within his writings John Brown had a masterpiece, namely 'Rab and his Friends', which came in the second series. In a gentle way it describes John Brown's hero, James Syme.

Edinburgh has been famous in a variety of ways, not least of which for its surgeons. It is difficult to say who is the greatest of Edinburgh's surgeons but in any discussion it would be impossible to dismiss Syme from the final analysis. It is curious that the greatest accolade that could be given to him was 'the Napoleon of surgery It is improbable that any modern surgeon would like his accolade to be 'the Hitler of surgery'.

James Syme was born at 56 Princes Street in 1799. As a boy much of his spare time was spent with Robert Christison working at chemical experiments. Robert Christison subsequently became the Professor of Materia Medica. Christison was a notable discoverer of pharmacologically important extracts, e.g. conine, the active principle of hemlock and the therapeutic use of digitalis. Syme, Christison and others founded a Chemical Society which met once a week. As a young man Syme discovered a solvent for india rubber and a process so that cloth could be impregnated with the substance and so become waterproof. He published his discovery but Mackintosh, a manufacturing chemist of Glasgow, read of the discovery, patented it and made his fortune as well as an eponym. Syme trained in Edinburgh in Medicine and in 1818 he joined the great Liston as a demonstrator and later assistant. Later in 1823, when Liston gave up teaching anatomy, Syme took over the class. In common with others, Syme visited Paris to attend the clinics of Dupuytren and also attended a course of operative surgery. On returning to Edinburgh one of his earliest major operations was an amputation of the hip joint, the first occasion that this operation had been performed in Scotland. The operation was made possible by the assistance of Liston who had incredibly strong hands and who, by pressure, controlled the bleeding. This operation established Syme's reputation as a surgeon. In 1826 he excised the head of the humerus for tuberculosis and 2 years later published a case wherein he excised the lower jaw for sarcoma. This was a remarkable operation, the tumour was an enormous size and the operation lasted 24 minutes. This took place at the time when anaesthesia and asepsis were unknown. Yet, 5 weeks later the patient was well and thinking of resuming his occupation.

A distinct feature of Edinburgh surgery has been of surgical giants dissipating their energy with petty quarrels. About the year 1823 Liston and Syme, who had taught together, worked together, suddenly quarrelled. Differences proceeded to such a degree and with so much acrimony amongst their various friends, that when Syme applied for a surgeonship at the Royal Infirmary, the Managers decided not to appoint him. The managers were concerned that Liston and Syme should openly quarrell in the hospital. Syme was faced with the dilemma of where to operate. Most of his operations were carried out in the home of patients, obviously the most unsuitable of surgical surroundings. He then

decided to establish a surgical hospital for himself and such a surgical hospital was opened by him in Minto House, an old mansion which stood on what is now the north side of Chambers Street. In the first three months 70 patients were admitted and this required that the surgical hospital be extended. His reputation was such as to rival that of the Royal Infirmary.

One of the great points in Syme's career was the publication in 1831 of his Treatise on the Excision of Diseased Joints. He also brought out his Principles of Surgery. In 1833 Professor Russell, Professor of Clinical Surgery, retired and there was a contest between Liston and Syme. Syme was appointed as Regius Professor and became one of the surgeons of the Royal Infirmary. Liston shortly afterwards was offered the Chair of Clinical Surgery at University College, London, which he accepted. Liston remained in London for the remainder of his days and conducted the first major operation under an anaesthetic at University College Hospital in 1846.

Syme introduced a new method of teaching clinical surgery. His method was to bring the cases one by one into a room where the students were comfortably seated. The patient, preferably, had not been seen by the surgeon and the surgeon took the history and worked out the nature of the disease in front of the students. This form of teaching became very popular in Edinburgh. The teacher, either in the presence or the absence of the patient, went on to explain the principles of treatment, his reasons for choosing the method preferred and the last patient would be operated on in front of the class. Such an operation would be done without anaesthetic or aseptic techniques. Syme temporarily went to University College, London, in 1847, but returned to Edinburgh after 6 months.

During the 36 years that Syme held the Chair of Clinical Surgery he was easily the finest of the surgeons in Edinburgh and many of his operations and other contributions to surgical practice are classics in the development of surgery. Half of this period belonged to the days before anaesthetics. His amputation of the ankle joint which goes by his name, was carried out in 1842. He also wrote on the power of the periosteum to form new bone in 1837. It is sad that during his life his career was full of acrimonious quarrels with Liston, his fellow surgeons and his fellow Professor, James Miller. In 1869 he had an epileptic seizure which was the first of a series of strokes which plagued him until his death in the following year. He was succeeded in the Chair by his son-in-law, Joseph Lister, the man who introduced antiseptic procedures in surgery.

Several people wrote about Syme, Dr. Joseph Bell wrote about him extensively as he worked in his outpatient clinic. But perhaps the best description was given by John Brown (1810-1882). John Brown was a student under Syme at Minto House and later practiced in Edinburgh. Though his practice was not large, he later became famous for essays collected under the title Horae Subsecivae amongst which 'Rab and his Friends' is to be found.

"More than 30 years ago Bob Ainslie and I were coming up Infirmary Street from the High Street, our heads together and our arms intertwisted. When we got to the top of the street and turned North we espied a crowd at the Tron Church. "A dog fight", shouted Bob and was off and so was I, both of us all but praying that it might not be over before we got up. Dogs like fighting; Old Isaacs said they "delight" in it and for the best of all reasons; and boys are not cruel because they like to see the fight. Well Bob and I are up and find it is not over. A small thoroughbred white bull-terrier is busily throttling a large shepherd's dog, unaccustomed to war but not to be trifled with." The story describes how the triumphant, victorious bull-terrier next takes on a large muzzled bull-mastiff. "Bob and I remove the mastiff's muzzle and the mastiff kills the terrier. The mastiff belongs to the Howgate Carrier, who carted from the Howgate Inn to Edinburgh. Bob and John frequently met and became firm friends of the mastiff, whose name was Rab. The Carrier's horse was called Jess."

"Six years had passed, a long time for a man, a boy and a dog. Bob Ainslie is off to the wars, I am a medical student and a clerk at Minto House Hospital."

"Rab I saw almost every week on the Wednesday and a much pleasant intimacy developed. His master I occasionally saw, he used to call me Maister John."

"One fine October afternoon I was leaving the Hospital and saw the large gates open and in

walked Rab with that great and easy saunter of his. After him came Jess, now white from age, with her cart and in it a woman carefully wrapped up, the Carrier leading the horse anxiously and looking back. When he saw me, James, (for his name was James Noble), he made a curt and grotesque bow, and said, "Maister John, this is the mistress; she has got a trouble in her breest — some kind of income we are thinking."

"By this time I saw the woman's face; she was sitting on a sack filled with straw with her husband's plaid round her and had his big coat with its large white metal buttons over her feet."

"I never saw a more unforgettable face — pale, serious, lonely, delicate, sweet without being at all what we call fine. She looked sixty and had on a mutch, white as snow with its black ribbon; her silvery smooth hair setting off her dark grey eyes, eyes such as one sees only twice or thrice in a life time, full of suffering, full also of the overcoming of it. She smiled and made a movement but said nothing, but prepared to come down, putting her plaid aside and rising. Had Solomon in all his glory could have been handing down the Queen of Sheba at his palace gate, he would not have done it more daintily that did James the Howgate Carrier when he had lifted down Ailie, his wife."

"Rab led the way into the consulting room, grim and comic, willing to be happy and confidential, Ailie sat down, undid her open gown and her lawn handkerchief round her neck and without a word showed me her right breast. I looked at and examined it carefully. What could I say? There it was, hard as stone, a centre of horrid pain. I got her away to bed. "May Rab and me bide?" said James. "You may; and Rab if he will behave himself." I wish you could have seen Rab. There are no such dogs now. He belonged to a lost tribe. He must have been ninety pounds weight at the least. He had a large blunt head, his muzzle black as night, his mouth blacker than any night. His hide was scarred with the records of old wounds. One eye out, one ear cocked as close as was Archbishop Leighton's father's. Rab had the dignity and simplicity of great size and having fought his way all along the road to absolute supremacy was as mighty in his own line as Julius Caesar or the Duke of Wellington and had the gravity of all great fighters. I never looked at Rab without thinking of the great Baptist preacher, Andrew Fuller. The same large heavy, menacing, combative, sombre, honest countenance. The same deep inevitable eye, the same look as of sunder sleep, ready, neither man nor dog to be trifled with."

"Next day my master, the surgeon, examined Ailie. There was no doubt it must kill her soon. It could be removed. It might never return. It could give her speedy relief. She should have it done. She curtsied, looked at James and said, "When?" "Tomorrow", said the kind surgeon, a man of few words. She and James and Rab and I retired. I noticed that he and she spoke little, but seemed to anticipate everything in each other. The following day at noon the students came in hurrying up the great stair. At the first landing place on the small well known blackboard was a piece of paper fastened by waifers and many remains of old waifers beside it. On the paper were the words, "An operation today, J.B. Clerk."

"The operating theatre is crowded. Much talk and fun and all the cordiality and stir of youth. The surgeon with his staff of assistants is there. In comes Ailie. One look at her quiets and abates the eager students. That beautiful old woman is too much for them. They sit down and are dumb and gaze at her. She walks in quickly but without haste; dressed in her mutch and her neckerchief, her white dimity short gown, her black bombazine petticoat showing her white worsted stockings and her carpet shoes. Behind her was James with Rab. James sat down at a distance and took the huge noble head between his knees."

"Ailie stepped up on a seat and laid herself down on the table as her friend the surgeon told her. Arranged herself, gave a rapid look at James, shut her eyes, rested herself on me and she took my hand. The operation was at once begun. It was necessarily slow and chloroform was then unknown. The surgeon did his work. The pale face showed its pain and was still and silent."

"It is over; she is dressed, steps gently and decently down from the table, looks for James and then turning to the surgeons and the students, she curtsies and in a low clear voice begs their pardon if she behaves ill. We put her to bed. James took off his heavy shoes, crowned with tackets, heel cap and toe capped and put them carefully under the table."

"For some days Ailie did well. The wound healed 'By the first intention', where James said, "Oor Ailie's skin is ower clean to beil." The students came in quiet and anxious and surrounded her bed. She said she liked to see their young honest faces. The surgeon dressed her and spoke to her in his own short kind way, pitying her through his eyes."

"So far well; but four days after the operation my friend had a sudden long shivering, 'a groosin' as she called it. I saw her soon after; her eyes were too bright, her cheeks coloured; she was restless and ashamed of being so. The balance was lost. Mischief had begun. On looking at the wound, a blush of red told the secret. Her pulse was rapid, her breathing anxious and quick. She wasn't herself as she said and was vexed at her restlessness. We tried what we could. James did everything, was everywhere and never in the way and never out of sight; Rab subsided under the table into a dark corner and was motionless, all but his eye which followed everyone. Ailie got worse, began to wander in her mind. Gently was more demonstrative in her ways to James, rapid in her questions and sharp at times. Her brain gave way. She sang bits of old Psalms, stopping suddenly, mingling the Psalms of David with homely odds and ends and scraps of ballads. One night she had fallen quiet and we hoped asleep. Her eyes were shut. We put down the gas and we sat watching her. Suddenly she sat up in bed, taking her bedgown which was lying on it, rolled up. She held it eagerly to her breast. This was the close. She sank rapidly, the delirium left her and as she whispered she was clean silly, there was a lightening before the final darkness. James returned to Howgate and returned with Jess and the cart. He had an armful of blankets and was streaming with perspiration. He spread out on the floor two pairs of clean old blankets, having at their corners AG, 1794, in large letters in red These were the initials of Alison Graham."

"I stood till they passed through the long shadow of the College and turned up Nicholson Street. I heard the solitary cart sound through the streets and die away and come again; I returned, thinking of that company going up Liberton Brae and along Roslin Muir, the morning light touching the Pentlands and making them like onlooking ghosts then down the hill through Auchendinny Woods, past Woodhouselee and as daybreak came sweeping up the bleak Lammermuirs and fell on his own door the company would stop. James would take the key and lift Ailie up again, laying her on her own bed, having put Jess up would return with Rab and shut the door."

Syme appeared to all but his personal friends as somewhat harsh, uncompromising and quarelsome. Syme expressed his feelings with the utmost candour.

The hostility which he excited in a few was greatly outweighed by the friendship he inspired in many. Syme lacked tact and probably he lacked a sense of humour. Syme was outstanding in a period of unparallelled progress in surgery, and he was seen by his contemporaries as the guiding force, announcing judgement on all that was new and holding fast to old doctrines which he believed well proven. His work on joint disease and aneurysms and his original method of amputation at the ankle joint were accepted by his fellows as his most important contribution to surgery. His textbooks and unique method of clinical teaching were held to be of even more importance, for all his teaching had great influence far beyond the Edinburgh Medical School. Syme entered his career when the repertoire of the surgeon was restricted and when surgery had no scientific background. When he died the field had widened remarkably and with the benefits of general anaesthesia and with the understanding of wound infection, the surgeon was no longer a crude technician. His operations are not used very much at the present time. His ingenious amputation at the ankle joint is now rarely employed. His excision of major joints for tuberculosis are now seldom required and his stricture of the urethra operation is of no importance. But all such operations and his radical approach to tumours and aneurysms were important at their time and from them was built up much of the modern surgical technique. He exerted an influence at least equal to that of Liston, Fergusson, Brodie and other surgical giants of his time. It was his ambition to be a leading surgeon and this undoubtedly he achieved.

References

Shepherd, J.A. Simpson and Syme of Edinburgh, Livingstone, Edinburgh & London, 1969.

John Brown. Horae Subsecivae, Second Series.
A. & C. Black, London

Comrie, J.D. History of Scottish Medicine, Vol.2.
The Wellcome Historical Museum, London.

●●

COMPUTED TOMOGRAPHY: A BRIEF HISTORICAL PERSPECTIVE

Prof. JJK Best, MSc, MRCP, FRCR
Department of Medical Radiology, University of Edinburgh

Radiology, diagnostic imaging, organ imaging, call it what you will, logically may be regarded as part of the physical examination of a patient. It is a more extreme example of the process that started with the invention of the stethoscope, the process of augmentation of our senses. This process may be extended beyond our normal senses so we may now appreciate the electrical activity of the brain or the heart, using the electro-encephalogram or electro-cardiogram. The very complexity of the technical processes involved, however, tends to make us see them as remote from the diagnostic relationship of patient and doctor.

The diagnosis of diseases of the brain provides us with a unique example of the role of these "augmented senses". The inaccessibility and delicate nature of the brain restrict the diagnostic tools we may use. The presence of a rigid bony box, the skull, protecting the brain prevents us from using our senses directly to examine the organ. Indeed, if we could examine it in our usual manner, the brain tissue might be destroyed by the use of percussion or palpation. The relative opaqueness of bone to X-rays limits the use of almost all plain radiographs. It is this very limitation that has provided an incentive to devise techniques to demonstrate the brain without damaging the brain tissue.

The purpose of this article will be to document briefly the pursuit of effective "non-invasive imaging methods", to use the current jargon, that has led to computed tomography (Table 1).

TABLE 1: Methods of Visualising the Brain

	Method	Image
(1)	History and examination of the patient	Imaginary picture of anatomical location of the lesion.
(2)	Electroencephalography	Surface electrical activity of the brain.
(3)	Skull radiography	Distribution of calcium in the head.
(4)	Pneumoencephalography	Position of the cerebrospinal fluid compartment.
(5)	Cerebral angiogram	Anatomy of the cerebral blood vessels.
(6)	Radio-isotope scan	Distribution of the blood brain barrier.
(7)	Echoencephalogram	Position of 3rd ventricle.
(8)	Computerised Tomography	Distribution of the radio-density of tissues in the head.

Skull Radiography

The first step in the pursuit was the introduction of radiography to medical practice early in 1896. Wilhelm Roentgen announced the discovery of X-rays in November 1895, and made public his first radiograph using a photographic emulsion plate a month later. It is doubtful if any technical innovation has been so rapidly introduced and commercially exploited. This could be achieved because the apparatus required to build an X-ray machine was available in many laboratories.

When Thomas Edison heard of the discovery of X-rays, he turned his attention to the problem of visualising the rays. During January 1896 he screened several thousand fluorescing crystals hoping to find one better than the barium platinocyanide used accidentally by Roentgen in his discovery. Edison discovered that calcium tungstate fluoresced some ten times more brightly and he coated a sheet of card with the crystals as a fluorescent screen. This device for use in fluoroscopy was advertised in Edison's mail catalogue later in the same year.

Figure 1: **Plain lateral radiograph of the skull. This demonstrates exquisite bone detail of the cranial vault and base, facial bones and cervical spine. The cerebral tissue is not seen.**

Other technical improvements produced skull radiographs which showed bones with exquisite detail but could only detect intra-cranial structures if they were calcified (Fig. 1). Thus, radiographs could be used to detect (a) asymmetry of volume of the cerebral hemispheres by displacement of a calcified pineal gland, (b) calcified brain lesions, and (c) infer chronically increased intra-cranial pressure because of erosion of intra-cranial bony structures such as the dorsum sellae. Because of the facility with which skull radiography visualised bone, it is still the first and best method to demonstrate fractures of the skull.

Pneumo-encephalography

Inspection of radiographs of the skull, chest or abdomen show that the structures that cast shadows of easily recognised different radiodensities are bones containing calcium, soft tissues containing chiefly water, structures containing fat and hollow organs containing air. The reason why air is so much less radio-dense than soft tissues is related to the fact that air is approximately 800 times less dense than water. It therefore might be expected that should air be introduced within the cranial vault, it would be easily detected on a radio-graph.

The first demonstration of the ventricular system by air came about, not as a result of a planned clinical procedure, but from an accident. On 24th November, 1912, a 47-year old man was knocked down by a New York tram, fracturing his skull and cutting his forehead above the right eyebrow overlying the fracture. Radiographs of the skull confirmed the fracture and the man was in hospital for 12 days and then took his own discharge. Seven days later he was re-admitted complaining of headache and vomiting. Examination showed papilloedema and a right extensor plantar response. Radiographs of the head at the second admission showed the ventricular system clearly seen and "enormously dilated with what was probably gas or air." At surgery, a cranial decompression was performed. One lateral ventricle was tapped and "the removal of the trochar was followed by two or three quick spits of air and fluid, and then clear cerebrospinal fluid to the amount of 8cc". The patient died one week later and at postmortem the dura over the frontal lobes was adherent to the fracture site and

a connecting tract was traced from the right frontal sinus to the frontal horn of the right lateral ventricle. It was postulated that air had been forced through the sinus and then into the ventricle when the patient sneezed or blew his nose.

What had happened was that the accident had introduced air, a contrast medium, into the brain which had been then detected radiographically. In retrospect it may seem a small step from this accidental demonstration of the ventricular system to the introduction of a deliberate procedure for injection of air to aid diagnosis. This does not seem to be the case, because it was not until 1918 that a surgeon, Walter Dandy, described the first injection of air into the head and in his report he makes no mention of the previous observations of accidental intracranial air. Initially, air was put into the ventricles by direct puncture having made a burr hole in the skull vault. This procedure is called ventriculography. The introduction of air into the subarachnoid space by lumbar puncture was subsequently described by Dandy in 1919 and is called pneumo-encephalography, (Fig. 2).

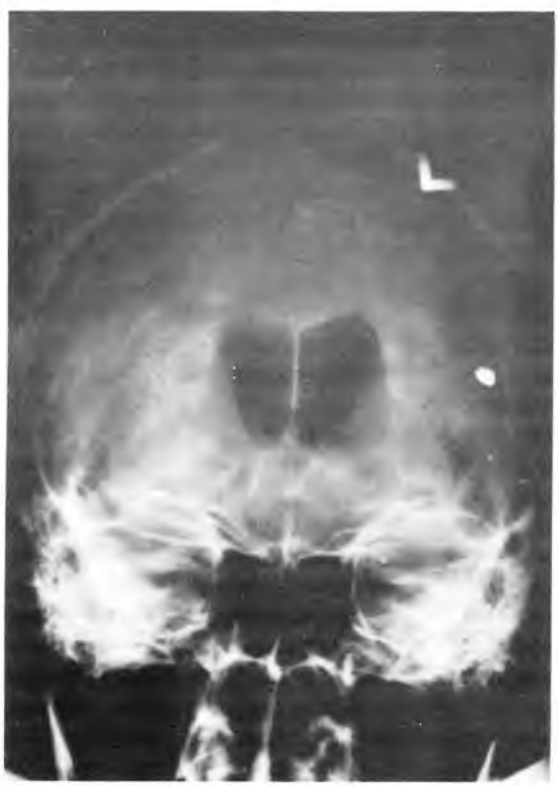


Figure 2: **A frontal view of an air encephalogram showing air outlining both lateral ventricles.**

Pneumo-encephalography was an important step in the evolution of imaging of the brain because it was the first method that provided information about structures inside the cranial vault during life. It did not show the brain tissue directly, but allowed inference as to the location of intracerebral masses by showing displacement of the normal anatomy of the ventricular systems and the cisterns. Unfortunately, the method causes considerable discomfort and is not without risk. It is a method that has been largely superseded by later methods, but it should be remembered that it was the most commonly performed brain contrast procedure for more than four decades.

Cerebral Angiography

In January 1896 within a month of the announcement by Roentgen of the first radiograph of a hand, E. Hascheck, at the suggestion of a colleague, O.T. Lindenthal, injected the brachial artery of a cadaver with Teichmann's mixture and demonstrated the blood vessels of the hand.

The major landmark in the development of clinical angiography occurred in Lisbon, Portugal in 1926, where the Portuguese neurologist, Egaz Moniz, performed the first angiogram in a living patient. Moniz and his associate, Almeida Lima, appreciated that they must find a substance opaque enough to X-rays to be seen against the density of the calcium of the cranium and which was sufficiently non-toxic not to harm the patient. They tested several substances and strontium bromide was selected. Moniz and Lima proceeded to inject a 70% solution of strontium bromide into the carotid artery of a dog and produced a clear radiographic picture of the cerebral arteries (Fig. 3).

→

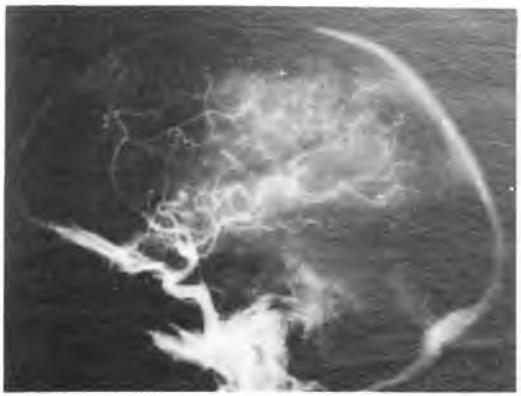


Figure 3: **A lateral view of a cerebral angiogram showing the internal carotid artery and its intra-cranial branches.**

After this successfu! pilot study the first living human patient had 10mls of 70% strontium bromide solution injected into the carotid artery after the artery had been surgically exposed. The first successful cerebral angiogram was performed on a 48- year old man with severe post-encephalitic Parkinsonism, using 14mls of 60% strontium bromide solution. Unfortunately, shortly after injection the patient showed signs of cerebral ischaemia on the site of injection and died the same day. Moniz was profoundly affected by this post-operative death, but with the support of his colleagues, continued his investigations using a 25% solution of sodium iodide instead of the strontium bromide solution. The third patient receiving the sodium iodide solution had a rapid injection of 5mls after temporary ligation of the carotid artery below the injection site. The cerebral anatomy was demonstrated and was shown to be distorted by the presence of an intracranial tumour.

The technique of cerebral angiography was received by the medical profession with some doubt, particularly with respect to its safety, but the technique became accepted because of its usefulness and within 10 years Moniz was able to report on the first 1,000 cerebral angiograms.

Modern cerebral angiography employs contrast agents which are much less toxic, possibly the least toxic pharmaceutical agents used by the medical profession. Although direct percutaneous puncture may be employed, increasingly, the use of catheters introduced via a femoral artery is used.

The pre-operative location of intracranial tumours became possible with an entirely new level of confidence following the introduction of cerebral angiography. Not only were cerebral tumours accurately located but because of the very nature of the technique abnormalities of the cerebral blood vessels could be identified. Aneurysms of the medium sized arteries are unique to the cerebral circulation and may be treated surgically. In order to do this satisfactorily, their location has to be accurately identified and cerebral angiography is the only wholly reliable method available to do this. Cerebral angiography may always have a place in the diagnosis of intracerebral lesions because although other techniques may demonstrate the presence of a lesion, the surgeon will require to know the vascular anatomy to plan his surgical approach and as there are variations in the anatomy of the cerebral circulation this must be characterised for each patient when the surgical approach that needs to be employed to remove a tumour may compromise the blood supply to the remaining brain.

Radioisotope Brain Scanning

Radioisotope imaging employs the principle that selected radioisotopes either alone or attached to other chemicals may localise either in an organ or in part of an organ and, because of the emission of energy due to radioactivity, be detected remotely outside the body.

In 1947 George E. Moore working in the University of Minesota Hospital was testing the usefulness of intravenous injections of fluorescein dye during surgery to localise brain tumours. This compound fluoresces brilliantly when illuminated by ultra-violet light. When the tumour was visualised directly by ultra-violet illumination, the lesion fluoresced brilliantly but the adjacent healthy tissue did not. Moore was stimulated by this observation and he reasoned that if a tumour accumulated more fluorescein than healthy brain, it might be possible to locate it without opening the skull by labelling the fluorescein dye with

a radio-active isotope and detecting it remotely.

Although we no longer use the radio-isotope used by Moore, iodine 131, and we employ very much more sophisticated devices to detect the location of the radioactivity within the cranium, we still exploit the unique property of intra-cranial capillaries observed by Moore in his fluor-escein experiments. The capillaries of the cerebral vessels are impermeable to a wide range of substances that pass readily through the capillaries in the rest of the body. The 'Blood — Brain Barrier' as this property is often referred to, is frequently destroyed by adjacent disease and is absent in the vessels of tumours. Thus, normal brain does not 'take up' radio-isotopes and abnormal brain will therefore show as an area of radioactivity (Fig.4).

Figure 4: **A radio-isotope brain scan, lateral view showing activity (the dark area) in the territory of the middle cerebral artery. The appearances suggest a cerebral infarct.**

Radio-isotope brain scanning has been largely replaced by computed tomography except in vascular disease where it is used as a simple non-invasive form of arteriography (via an intravenous injection) to observe the pattern of blood flow, the dynamic radio-isotope brain scan.

Echo-encephalography

The concept of measuring distance using sound is familiar to anybody who has observed a flash of lightning and then counted the seconds to when they hear the peal of thunder. The use of sound to measure distance is used by both bats and porpoises in a more complicated manner, they both generate the sound and listen to the echo and have evolved very accurate ranging and locating senses.

The sinking of the steam-ship Titanic by an iceberg in 1912 precipitated the proposal to detect icebergs by sound echoes. More sophisticated underwater echo locating devices were developed during both World Wars and became the 'sonar' which is used today.

The use of ultrasound — the name given to sound waves of very high frequency and short wave-length well above the range audible to the human ear — to image internal organs in the human body is familiar to many people now because of its use in estimating foetal maturation during pregnancy. One of the earliest applications of ultrasound, however, was in a simple form to demonstrate the symmetry of the volume of cerebral hemispheres. A Swedish neurosurgeon, Lars Leksell, demonstrated in 1956 that a pulse of ultrasound introduced at right angles through the squamous temporal bone produced an echo from a midline soft tissue structure (Fig. 5). This echo is

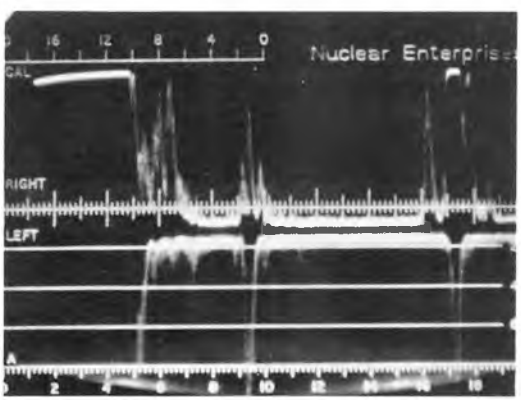


Figure 5: **An echoencephalogram. An amplitude modulated oscilloscope trace (repeated and inverted below) which shows 'spikes' demonstrating the squamous temporal echoes and a midline 'spike'.**

generated from the lateral walls of the third ventricle and any mass lesion in either hemisphere causing displacement of the third ventricle will cause displacement of the echo and therefore may be detected.

Bone does not conduct sound well and it is only the thin squamous temporal bone that allows an 'acoustic window' in the skull vault in the adult. In the neonate however the fontanelles give an acoustic window which allows more complicated ultrasound imaging techniques to be used.

The use of ultrasound to detect midline shift has been largely superseded by computerised tomography, except possibly in the situation of acute head trauma, because it is possible to monitor the patient in situations where the patient is being resuscitated and because the apparatus used for echo-encephalography is readily portable.

Computerised Tomography

In retrospect, it is difficult to realise the impact that the demonstrations of cerebral anatomy made by computerised tomography had on the medical profession when first demonstrated in 1971. It is important to remember that all the imaging methods described so far do not demonstrate normal cerebral tissue and the presence of mass lesions can only be inferred from the displacement of the normal anatomical structures displayed. Additionally, the most specific methods, air encephalography and arteriography, both carry a significant risk of morbidity and are very unpleasant procedures for the patient. The importance of the development of computerised tomography has been recognised by the award of the Nobel Prize for Medicine in 1979 jointly to G.N. Hounsfield and A.M. Cormack for their work in this development. In retrospect, it may be seen that there were several contributors to the concept of computed tomography and the background to the development still shrouded in some secrecy, but the final break-through to a useable diagnostic tool was made by Godfrey Hounsfield, an electronics engineer employed by E.M.I. (Electro Musical Industries), a company famous for records but not involved in the manufacture of X-ray apparatus. The first prototype, a brain scanner, was installed at the Atkinson Morely Hospital in October 1971, and the first scan carried out on a 41-year old female patient with a suspected left frontal lobe tumour, the tumour was clearly demonstrated.

Computerised tomography uses X-rays and the physical principles involved in the generation of the image are identical to those used in conventional radiography and therefore it may be thought of as taking radiographs of thin slices of a patient cut in the transverse plane. An X-ray tube provides a source of X-rays which are directed in a thin beam through the patient which are detected not by radiographic film but by scintillation or ionisation detectors. This system allows very accurate measurement of the transmitted X-ray energies. The X-ray tube and detecting system are rotated round the patient on a gantry and many measurements of the amount of X-rays passed through the patient's body are made. With the use of a computer, these measurements are used to calculate a pattern of X-ray absorption throughout the slice of the body through whcih the X-rays have passed. The original scanner was designed to scan the brain only and each scan took several minutes. Modern scanners can scan any part of a patient in a time which may be as short as two seconds. The numerical values representing the X-ray absorption pattern are converted to a grey-scale picture which is displayed on a television monitor and which may be photographed (Fig. 6).

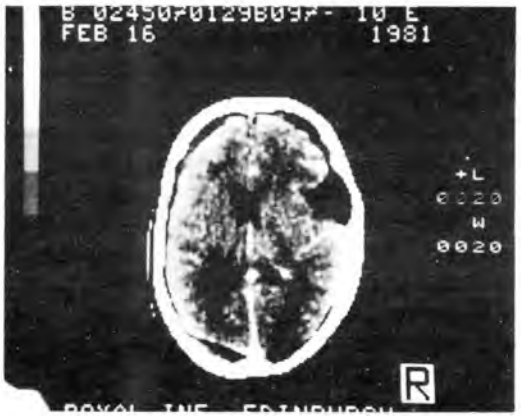


Figure 6: **A computed tomography scan, the transverse section demonstrating the frontal horns of both lateral ventricles and the cerebral tissue.**

Many concepts of neurological disease have changed by virtue of computerised tomography scanning. The ability to detect disease now means that virtually all brain tumours may be detected and localised by computerised tomography during life. The impact on neuroradiological practice has been very great, investigations mentioned in this article which before the advent of computerised tomography were the tools which allowed the morphology of neurological disease to be demonstrated have had their pattern of use significantly changed. Pneumo-encephalography is now infrequently performed, even in specialised neuroradiological centres. Radioisotope brain scans are now infrequently performed in centres with access to computerised tomography. Arteriography is still performed but the reason for its use has changed with emphasis turning from the demonstration of gross anatomy towards the demonstration of vascular abnormalities.

Computerised tomography scanning has become such a crucial part of diagnostic neurology and neurosurgery that it has assumed the same role that conventional radiography has for the orthopaedic surgeon. It is impossible to conceive of a practice of modern neurology without access to computerised tomography.

●●

PRINCIPLES AND PRACTICE

ACTIVE MANAGEMENT IN SERIOUS GENETIC DISORDERS

by
J.A. Raeburn PHD, FRCPE
Senior Lecturer in Human Genetics
University of Edinburgh

"... et nous faisons maintenant la medicine d'une methode toute nouvelle"
Le Misanthrope, Moliere, 1666

Twenty years ago we were taught to classify the cause of any medical condition into those that were 'genetic' and those that were 'acquired'. Subsequently the acquired group could be subdivided according to aetiology. Either directly or by implication we were told that genetic disorders were untreatable and that they were always rare, making up an insignificant proportion of medical practice. This article gives a personal view of the field of medical genetics and is based on two established facts, firstly that genetic diseases are now so frequent that every doctor should be conversant with basic genetic principles. Secondly many genetic conditions if not amenable to curative treatment, are at least responsive to careful management which can prolong and increase the quality of life. At this stage we should emphasise one other aspect, which concerns the philosophy behind genetic counselling. Such counselling is not just the calculation of empiric or theoretical risks that a disease will recur, followed by telling the family and then leaving them to come to terms with unpleasant probabilities. In genetic counselling the range of options open to different members of a family can be fully explained in the light of their risks. At the same time counselling of a wider nature can be offered providing emotional support to many members of the family. By allowing individuals within a family to come to terms with the emotional aspects of an inherited condition, counselling, not necessarily provided by a genetic counsellor alone can be actively therapeutic.

Let us now select some severe disorders with a major genetic component and examine the therapeutic approaches available.

DOWN'S SYNDROME

In the United Kingdom there are at least 19,000 patients with this chromosomal disorder, of whom around 30% are in long-stay institutions. It is well known that the older pregnant woman has a higher risk of having a Down's baby, so that above the age of 40 the risk exceeds 2%. It is less frequently understood that over 70% of babies with Down's syndrome are born to mothers who are aged less than 35, simply because the majority of pregnancies occur in younger women. The first implication of this figure is that amniocentesis, followed by selective termination of pregnancy, if offered to women over 35 will make only a small reduction in the birth incidence of Down's syndrome. At present there are no screening tests available to identify most of the younger women at risk of having babies with Down's syndrome. Since amniocentesis for the detection of chromosome abnormalities cannot be offered to all pregnant women, it follows that for the foreseeable future there will continue to be a large number of Down's births. Therefore it is essential to pursue all possible approaches in treatment.

Management

Virtually all babies with Down's syndrome are identifiable at birth and this presents the

advantage of early initiation of active management. This begins with a frank discussion with both parents, hopefully with the baby present, in which the features are explained briefly as well as what is known of the aetiology. Initially the parents may be so shocked that they say very little and appear to have no appropriate questions. However, it is important that they can form a good relationship with *one* doctor so that they can ask about whatever might worry them during the succeeding weeks or months. In the first few days it is often useful to suggest that the couple meet other parents, from similar families. This not only provides emotional help from someone who has met (and overcome) the same distress, but another parent can also encourage the couple to talk openly with the professionals about their fears and uncertainties. It is essential that all who confront a couple in this situation give honest answers to all their questions, even if the answer is that we do not know. Only in this way can a trust be built up with the professional services which is strong enough to augment active management.

The mainstay of management of most aspects of Down's syndrome in the first year is active stimulation. Thus the hypotonia is helped by simple physiotherapy whilst social development is aided by active stimulation of visual, auditory and tactile senses. In all aspects the parents and siblings can play a major role here, with appropriate professional guidance. A most successful recent innovation has been the appointment of educational home visitors who guide the parents and encourage them to teach a wide range of skills. The preliminary results of such 'active' management are yet to be evaluated fully but the signs are that the prognosis in Down's syndrome has been improved to such an extent that information in many textbooks, printed only a few years ago, is now out of date and excessively pessimistic.

Figure 1: **Close contact with normal children is a further and most successful way to ensure that Down's infants are stimulated. A normal child can be much more sensitive to the short attention span of a handicapped child than an adult can.**

For the immediate future there are still more possibilities. Firstly we could consider the impact of the electronics industry on the habilitation methods available for Down's syndrome infants. There are a variety of electronic toys which are now sold for normal children which provide stimulation for certain useful skills. I have already found that children with Down's syndrome can enjoy these games and can thereby be encouraged to develop some quite specific skills (eg. memory or hand-eye coordination). Within a short time simple computer systems, dedicated to the minimisation of mental handicap will improve communication skills and thereby encourage better integration in the community. Some doctors are quite unaware of the recent rapid advances in educational psychology which have led to improved, more pragmatic teaching for the mentally handicapped. In Down's syndrome their excessive pessimism rapidly influences the parents who may either abandon all attempts to teach the baby simple skills (a course of action which would "handicap" the normal infant) or else may lose faith in all professionals, having realised the inaccuracy of early medical advice.

Vision and Hearing in Down's Syndrome

There are several surveys which show that up to 80% of young children with Down's syndrome have visual or hearing handicaps which are easily amenable to treatment. In the case of hearing difficulty there are several causes, but transient or partial deafness often results from the narrower external auditory canal which, along with the susceptibility to upper respiratory infection, leads to middle-ear damage. It is easy to understand why a young child who is transiently deaf, who has visual handicap and whose parents have been told that the prognosis for speech and other communication skills is very poor, will fail to achieve.

Down's syndrome is certainly a genetic condition which at present is incurable but there are surely numerous possibilities for active management. The principle to use in management is that the condition has many features, affecting a wide range of body functions. Only when we have treated all the treatable aspects fully will we truly discover the extent of the genetic handicap and the influence of new measures upon the developing Down's child's brain. When I counsel the parents of a Down's baby and they ask about the future I do not give them an unqualified and optimistic prognosis. Rather I tell them what we do now know while also mentioning all the positive actions that can be taken and that are known to minimise handicap.

INBORN ERRORS OF METABOLISM

Although individually very rare (the incidence of phenylketonuria is around 1 in 10,000 while for maple syrup urine disease it is 1 in 120,000) the inborn errors of metabolism collectively cause sufficient handicap for every paediatric unit to be provided with resources for diagnosis and management. For over 20 years phenylketonuria (PKU) has been successfully managed by restriction of dietary phenylalanine. It has also been shown that the dietary regime can be relaxed in late childhood without apparent deterioration in cerebral function. Thus this genetic disorder can be managed so that the major handicap is preventable even if the genetic defect persists. There are other inborn errors in which this principle could be applied such as maple syrup urine disease in which restriction of the branched-chain amino acids (leucine, isoleucine and valine) can lead to immediate clinical improvements. In this disease also, therapy with pharmacological doses of thiamine (up to 1000 mg per day) which acts with residual enzyme as a co-factor can also produce both clinical and biochemical improvement. Recent experience with PKU has highlighted what may be a problem in many genetic diseases. Women who have been successfully treated for PKU in infancy and childhood are now reaching the child-bearing ages and several pregnancies have now been described in the literature. The risk of their offspring also having PKU is low, provided the father is unrelated to the mother and therefore unlikely to be a carrier of the disease. However, if the mother does not return to the special PKU diet before the time of conception and throughout pregnancy, the foetus will be subjected to grossly elevated levels of phenylalanine and is at high risk of congenital defect, particularly mental handicap. Institution of a phenylalanine controlled diet prior to and throughout pregnancy can almost completely prevent such disasters. Whilst this highlights a growing problem, the PKU experience illustrates how other inborn errors of metabolism may affect a foetus and opens up new approaches to preventive therapy.

Still more exciting is the possibility that some important inborn errors might be permanently controlled by the replacement of a missing enzyme with grafted tissue, possibly fibroblasts or bone marrow stem cells, from a histocompatible donor. Early evidence shows that in certain types of mucopolysaccaridosis, particularly Hurler's syndrome, such therapy can lead to prolonged biochemical improvements. The long-term clinical benefits are not yet known but, in theory at least, a bone marrow graft will be able to establish a source of monocytes from which macrophages in all parts of the body including the brain can be derived. Such treatment might be considered for many inborn errors of metabolism provided the enzyme is synthesised by monocytes or other donated cells.

CYSTIC FIBROSIS

Cystic fibrosis (CF) is the most frequent autosomal recessive condition in Caucasians with a birth incidence of approximately 1 in 2,000. This means that around 1 in 22 are carriers of the disorder, a proportion which has stimulated a

search for precise methods for identifying the abnormal gene, whether in single or double dose. In Edinburgh, Drs. Jean Manson and David Brock have produced an antibody in guinea pigs to cystic fibrosis protein which shows early promise in detecting carriers of CF or pre-clinical cases. However, despite intensive research throughout the world the exact cause of CF remains elusive.

Our failure to know the biological basis for cystic fibrosis, however, need not mean that there is no treatment. Around 80% of CF patients have pancreatic insufficiency and for most of these malabsorption symptoms are improved adequately after regular therapy with appropriate enzymic dietary supplements. It may not be long before 'human' pancreatic enzymes are produced inexpensively in pure forms by bacteria as a result of genetic hybridisation manipulations.

All CF patients are at risk of respiratory infection and this is the major cause of morbidity and mortality from the disease. During the past 20 years, however, antibiotic therapy and active physiotherapy have brought about a fair improvement both in the quality of life and in life expectancy, so that over 50% of CF children can now survive into adulthood. It is clear that there is a long way to go before the CF problem has been controlled, but some new regimes, which aim at individualising therapy for each patient based on the respiratory and immunological competence, are producing promising results.

CONGENITAL CNS MALFORMATIONS: A RAPID GENETIC SOLUTION?

When I began genetic counselling almost ten years ago we saw many couples who had recently lost a baby in the neonatal period because of spina bifida or ananecephaly. We knew that the risk of further children being involved was moderately high, 1 chance in 20, or even higher if other children had been affected or there were previous spontaneous abortions. At that stage the mainstay of prevention was the parents' decision to have no further children. Shortly afterwards, in 1972, Dr. David Brock and Roger Sutcliffe showed that the amniotic fluid level of alphafetoprotein (AFP) was markedly elevated in pregnancies in which there was an open neural tube defect. This added a new approach for the prevention of CNS malformations. Parents at high risk could be offered an amniocentesis and, if the foetus was thereby shown to be affected, they could consider a termination of pregnancy. However, the (small) risk of amniocentesis was only justified if there was a high risk of neural tube defect, recognised because of a previous affected baby. Two or three years later David Brock found that a high proportion of pregnant women whose foetus was affected could be identified by the measurement of *maternal serum levels* of AFP at 16 weeks gestation, followed by selective amniocentesis in the 2 or 3% whose level was above a certain point. This identified the *first* foetus to be affected in many families.

During the past 18 months it has been shown that multivitamin or folic acid therapy taken for two months before and after conception may significantly reduce the risk of neural tube defect, even in 'high risk' families. The reason for this beneficial effect is far from clear but the data point to a simple dietary approach to the control of common and serious malformation syndromes. In the space of ten years we have passed from the dilemma of families with a high recurrence risk, via the ethical difficulties of selective terminations of pregnancy, towards realistic evidence of primary preventive therapy.

SUMMARY

This article has described briefly some aspects of four diseases or groups of diseases which are genetically determined in whole or in part. Collectively they account for morbidity in around 1% of all conceptions and this fact belies the notion that genetic diseases are rare, even though there are many other inherited disorders which have not yet been considered. The main aim of this review has been to emphasise positive methods of management in four quite different situations. However, the principles of management are the same in all instances: if a direct cure of the pathological process is not yet possible then the different aspects of the pathology can be tackled, separately and energetically, such as deafness due to infection in an infant with Down's syndrome or the respiratory infections in cystic fibrosis. Such simple measures can very greatly improve the quality of life and the prognosis notwithstanding our lack of knowledge about the precise genetic defect. Furthermore, the possibility of

direct therapy which is curative may not be far off for several genetic disorders. Anyone who seeks to manage a disorder with a hereditary element in the 1980s would do well to take note of Hilaire Belloc's sarcasm:

"Physicians of the utmost fame
were called at once, but when they came
they answered, as they took their fees,
'There is no cure for this disease'."

There may be few 'cures' for genetic diseases but for the physicians with a therapeutic interest there is a challenge which may often be successfully tackled.

●●

MUGGINGS AND ASSAULT

W. Donald MacLennan, FDS, FRCSEd
Professor of Oral Surgery,
University of Edinburgh

The term "mugging" has come to be accepted as synonymous with the type of damage which is inflicted by thugs on members of the community. In fact it is the act of attacking from behind or seizing an individual by the throat. To "assault" is to attack violently but this need not be entirely physical and may indeed be at least in part verbal, as for example in an argument.

Regrettably the incidence of both is increasing year by year, and not infrequently may endanger life. The circumstances relating to muggings and assault are many, but fall essentially into two groups — the provoked attack and that which is unprovoked. There tend to be three distinct patterns of attack — "man-to-man" contact, that which falls into the category of "gang warfare" in which several individuals attack another group, while gang assaults on individuals are also constantly in the common press. Young people require avenues of expression and if this is improperly provided for, or inadequately controlled, it can lead to violence. Every citizen has a responsibility to the community in which he or she lives and there can be no doubt that they can often discourage such aspects of life as juvenile delinquency and violence by providing facilities and amenities designed to combat such socially unacceptable behavioural patterns. Indiscreet use of the tongue, facial muscles of expression, and digital signs may individually or collectively predispose to evoking physical response from others. Understanding of these precipitating factors and conscious effort to avoid them by whatever means are available will obviously reduce the number of cases of assault. Only a small proportion of such cases reach either the courts or the hospitals and it can be assumed that those which do are of the more serious type.

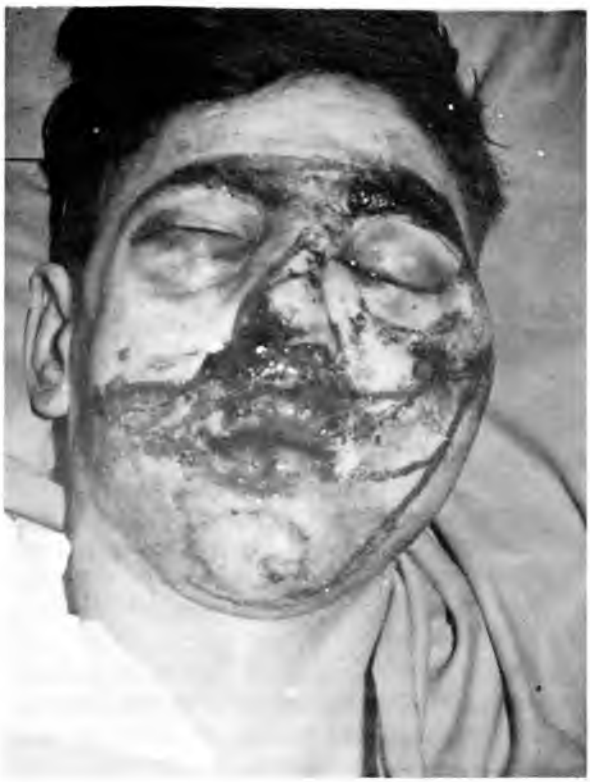
The injuries which may be sustained range from the trivial to more extensive. Some, as already mentioned, may endanger life itself. In addition, it is essential to appreciate that any part of the body may be involved.

Assaults affect both sexes. Age is of little concern, even the infant is exposed in the now universally acknowledged "battered baby" syndrome, while at the other extreme of life it is regrettable, but factual, that an increasing number of elderly over the age of 70 years are attacked, robbed and/or sexually assaulted. Robbery may be the motive. Many attacks are precipitated by alcoholic over-indulgence, while others are apparently motiveless.

The object of this article is to draw attention to the facial injuries, but it is imperative that assault patients should be examined in the greatest of detail in order to ensure that no injury is overlooked. The most common sites are head, chest, limbs, abdomen and genitalia. Damage to genitalia in the male of the species is frequent. The mode of attack is to get the victim on the ground by whatever means and then to "put in the boot" which is the term used to indicate the use of the boot to kick the head and the crotch alternately. Under this barrage the hands of the victim will be directed fleetingly up and down in an attempt to protect the individual's person. This strengthens the belief that attention to detail is imperative with the recognition of bruising in particular on the backs of hands and extremities; namely the face and head, pelvis and genitalia.

Society is aware of the need to reduce crime to a minimum and to ensure that those who indulge in crime are duly punished for so doing. Thus, if detailed medical evidence is obtained, the greater are the chances of bringing about a conviction and of meting some with the correct punishment. Case-notes must therefore be detailed, bruising should be systematically committed in writing, where possible, and photographed when required for presentation in court.

The main features to be attended to in the



Example of Facial Injury

emergency care of assault victims are the four C's, namely:—

A. Control of Respiration

B. Control of Haemorrhage

C. Control of Shock

D. Control of Fractured Fragments

A. **Control of Respiration**

Of all the causes of respiratory embarrassment, the aspirations of blood, secretions and/or vomitus is potentially the most dangerous and immediate efforts must be taken to ensure the maintenance of the airway. The patient should be placed in the semi-prone position, that is on the side with the underarm pulled through and the upper leg flexed, while the head is supported. All debris should be removed from the mouth and oro-pharynx. A patent oral or naso-pharyngeal airway may be inserted.

B. **Control of Haemorrhage**

Haemorrhage is fortunately not normally a serious complication of facial injuries although the immediate blood loss, particularly in cases of severe middle-third fractures of the face, may necessitate transfusion. In the elderly the combination of physical damage and haemorrhage may create a partial obstruction. Even a minimal hypoxia may lead to irreversible cardiac failure if allowed to persist. Knowledge of digital pressure points in the face and head may well prove of value in the control of local haemorrhage, as for example compression of the superficial temporal artery against the skull in front of the tragus of the ear; the digital pressure over the mandible at the anterior border of the masseter where the facial artery crosses on its upward path; and the bidigital pressure of the lips to control the superior and inferior labial arteries.

C. **Control of Shock**

Shock is experienced to a greater or lesser extent by all trauma victims and presents in one of two forms — vaso-vagal or neurogenic shock and that due to acute blood or plasma loss. In both the blood pressure is reduced significantly. In neurogenic shock the systolic and diastolic pressures are affected, while in hypovolaemic shock the systolic pressure is usually reduced to not less than 60 mm of mercury. The pulse rate in the former is slow and the skin pale but often warm, while in the latter the pulse rate is fast and the skin cold and clammy.

Blood loss is not always apparent, witness the "hidden" haematoma associated with fractures of long bones, particularly the femur. Similarly, intra-abdominal haemorrhage from the liver spleen and kidneys may be responsible for both acute and chronic blood loss. Two other common sources of fluid loss are worthy of note, namely those related to vomiting and sweating. Such factors influence the type of fluid replacement and the rate at which such fluids are given. Blood examination including the haemoglobin level and cross-matching, in case of transfusion, should be

carried out as soon as possible and supplemented thereafter by electrolyte studies and measurement of blood gases so that base lines can be established upon which to assist subsequent treatment.

D. Control of Fractured Fragments

In the "battered baby" syndrome facial injuries other than bruising are infrequent, but in the severe case the lower jaw can be fractured. The elasticity and the shape of the mandible in the infant preclude all but the most serious damage when, should the temporo-mandibular joint be involved, subsequent development of the lower jaw may be adversely affected creating facial deformities and interference with masticatory efficiency.

The facial injuries sustained by the teenager and those in the older age groups range from bruising, loss of teeth, cuts and lacerations,to the most extensive facial fractures involving joints, sinuses and even brain. Blunt objects — the fist, boot, bricks and hammer are examples of some of the more common of these which may give rise to the most grotesque facial injuries — such damage may leave permanent scars of both mind and body.

The treatment of these injuries demands attention to detail. As has already been indicated, the primary responsibility is to maintain life and every effort should be directed to the immediate resuscitative measures. The principles of repair in the facial region are to reconstruct the facial skeleton and then restore the soft tissues as carefully and atraumatically as possible. Such efforts may require repeated operations necessitating hospital admission and follow-up appointments.

The eyes are protected by the forehead, the nose and the malar prominences. Damage to the latter therefore requires operative interference to restore this important part of the triad to its correct degree of prominence. Indeed the aim in all facial fracture treatment is to reduce and immobilise the fractured fragments as near to the anatomical position as possible, consistent with function. This last observation is important as the very young and the very old resent rigid fixation and may even suffer from it.

Intra-oral wounds are obviously exposed to potential contamination from saliva, foreign bodies, debris and food. Nasogastric feeding has an increasing part to play in ensuring adequate dietary intake on the one hand and assisting in maintaining oral hygiene on the other. Improved instrumentation, anaesthesia and therapeutic agents, in particular the antibiotics, have greatly assisted the surgeon in his efforts to restore those who have been seriously assaulted to normality. Alas, too frequently this challenge proves to be impossible and even when the body is restored, the damage to the mind may be irreparable.

Many of the operations require a "team" approach in which the skills of various surgical disciplines are utilised. This is one of the reasons whereby the standards have improved and the end results compare favourably with those in any other part of the world. The development of this "team" approach with such as the modern sophisticated oral, maxillo-facial and plastic surgery unit has largely taken place since the Second World War. The excellence of such services is the envy of the free world and is a fitting testimony to the National Health Service — a ready condemnation of its many critics.

injuries has been alluded to in so far as maintenance of life is concerned and it has been stressed that in this the control of the facial fracture fragments seldom takes precedence. Better by far to have a live patient with a "dish-face" deformity, than perfect reduction with fixation which requires to be viewed in the mortuary.

Early measures to effectively control facial lacerations and/or fractures are designed towards closing soft tissue injuries in layers with as satisfactory a cosmetic result as possible while supporting the facial skeleton. The amount of interference is entirely controlled by the general state of the patient. In the conscious state dentures, particularly partial dentures, if intact, may afford considerable support and should not be removed. In the semi-conscious or unconscious patient, however, all loose foreign bodies should be removed in the interests of safety. A simple crepe supporting bandage may be applied. This should never be tight as attempts to affect complete closure with the teeth in occlusion only causes pain and acute discomfort. The barrel bandage which is widely supported by first-aid workers is mentioned only to be deprecated as it so often allows the chin to be pulled backwards, a particularly dangerous situation and most likely

to happen when the patient has bilateral fractures of the lower jaw involving the premolar regions. In such circumstances, the muscles of mastication attached to the inner aspect of the mandible allow the anterior fragments to be pulled backwards and downwards thereby allowing the tongue to be depressed and mechanically occlude the airway. Active steps can be taken to control this effect, as for example by the insertion of an oral or a nasopharyngeal airway.

A very substantial number of assault and mugging injuries have facial involvement. In some ways they epitomise the horrific permanent disabilities which may ensue — brain damage, which in its most severe form may transform a healthy well-orientated individual to that of an intellectual vegetable; gross facial scarring which may cosmetically be beyond the salvation of the surgeon's knife; loss of sight; loss of hearing; loss of the senses of taste and smell — frequently underestimated handicaps, particularly in the insurance claim; loss of teeth with the associated effect on appearance and function. Indeed the potential damage is endless and so much of it is so totally unnecessary.

Surely there is a need for greater public awareness of a section of society which not only exists but increases yearly, indiscriminately attacking and maiming as they proceed through life. Every member of the public has a moral responsibility to assist the law in containing crime. This demands vigilance at all times and the early recognition of circumstances which are getting out of hand. Thus individual and collective violent behavioural patterns are more likely to be more effectively controlled.

DUM SPIRO SPERO

THE DIAGNOSIS OF KNEE PAIN

MF Macnicol, MCL Orth, FRCSEd (Orth)
Senior Lecturer in Orthopaedics
University of Edinburgh

The knee is open to injury because it is designed for rapid action, not simply during its large excursion from extension to full flexion, but also lesser accommodative movements of rotation, tilt and glide. As if that were not enough, that highly developed but sometimes temperamental sesamoid, the patella, adds its own unique problems. The complexities of these movements are reflected in the subtleties of the structure of the knee. Regrettably they have also led to a proliferation of clinical tests and surgical repairs whose sophistication confuses rather than enlightens.

Before enquiring about the characteristics of the painful knee the general characteristics of the patient should be assessed quickly. In children problems usually relate to patellar malalignment syndromes, possibly a discoid meniscus, and the aching discomfort produced by traction apophysitis such as Osgood-Schlatter's disease of the tibial tuberosity. After puberty girls are particularly likely to develop patellar pain, which may be associated with lateral subluxation of that bone. In the young woman the sources of such pain may be so prolix that the surgeon may do more harm than good if he operates. During adolescence and early adult life males are most likely to suffer from meniscal and ligamentous tears, often brought on by exertion or accidents during sport. A patient with an endomorphic physique usually has associated genu valgum and may present with medial ligament sprains and patello-femoral pain. Those with ligamentous laxity are also prone to sprains and patellar subluxation. The mesomorphic athlete is likely to injure the menisci, or may come in with significant tears of the ligaments and synovium.

The older patient begins to experience pain from degenerative changes in the knee which affect principally the menisci and articular cartilage. Symptoms arising from osteoarthritis, rheumatoid arthritis and allied arthropathies, such as haemophilia, constitute a major area of endeavour for the Orthopaedic Surgeon, but that lies beyond the scope of this article.

HISTORY TAKING:

The circumstances of an injury to the knee should be carefully recorded in a manner that would do justice to the police. The mechanism of injury should be recorded if possible although accidents are rarely recalled in detail. Was the violence direct or indirect? Was the knee flexed or extended? Was it weightbearing at the time of the injury, and was weightbearing possible immediately after? Could the patient finish the game of football or did he have to be carried off immediately? If the knee became swollen, how quickly did this develop? (A haemarthrosis is usually evident within two hours of injury, whereas an effusion will take six or more hours to develop).

Locking:

Locking of the knee should be carefully sought after, remembering that it classically refers to a block to extension. A major loss of extension, perhaps over 30 degrees, suggests ligament disruption rather than a meniscal lesion. Did the locking persist, or was it possible to straighten the knee after a certain manoeuvre? Has the locked knee gradually straightened out with forceful attempts at extension, suggesting that the tear has been completed anteriorly through the substance of the meniscus? Is the locking intermittent but regular? A loss of flexion always accompanies a block to extension, and the patient will find squatting impossible.

Instability:

The knee may also give way after an injury and

this may either be due to the instability resulting from a ligament rupture, or from meniscal pathology. Another common cause of giving way occurs when the patella subluxes laterally, but this is more usually a spontaneous feature, particularly in the individual with poorly developed quadriceps. Sometimes the instability will only be evident when the patient is changing direction, with no apparent problem when walking in a straight line on level ground. Ascending and descending stairs, particularly the latter, may produce discomfort and a feeling of uncertainty in the knee. This feature is not specific for any single internal derangement, but is a common complaint. Kneeling may also prove difficult, particularly in those with a damaged meniscus, and sitting for prolonged periods of time may precipitate acute discomfort in those with patello-femoral pathology.

The history should include any relevant past history, and previous injury or infection of the joint should be recorded. A family history of similar symptoms may be present, particularly in those prone to patellar subluxation or meniscal tears. In those suspected of an inflammatory condition, the enquiry must include the possibility of rheumatoid arthritis or a venereal arthropathy.

Fig. 1. The arthroscopic appearance of the normal meniscus with a smooth inner rim. The femoral and tibial articular surfaces can be seen above and below.

CLINICAL EXAMINATION:

Before asking the patient to lie on the examination couch, watch for the presence of a limp or any other abnormality in gait. Remember that pain in the knee, particularly in children, may stem from pathology in the hip joint. A good "acid" test of significant internal derangement of the knee is to check whether the patient can squat fully. A tell-tale loss of full flexion in the affected knee indicates damage to the meniscus or possibly the presence of an effusion. An even more demanding test is then to ask the patient to "duck waddle" by walking in the squatting position. This stresses the joint particularly severely.

If the examination is to be thorough a particular order should be followed, such as:—

1) to look

2) to feel

3) to move the knee.

Inspection:

Inspection should include the appearance of the skin, and the presence or absence of swellings such as prepatellar or infrapatellar bursae, a popliteal cyst, a saphena varix or a lateral meniscus congenital cyst. The chronically injured or inflamed knee will show a classical reversal in contour, in that the quadriceps muscle wastes and the synovial envelope hypertrophies. The presence of scars should complement details culled from the history. Valgus, varus and torsional abnormalities of the knee should be assessed and may have a bearing on the source of the pain. Patella alta is said to be more common in those suffering from retropatellar pain, and the general alignment of the patellae should also be observed. Quadriceps wasting is best measured at this stage and should be compared to the normal leg by a measurement of the thigh girth at a set level above the superior pole of the patella. Muscle wasting in the distal parts of the legs should be noted, and the knee, ankle and plantar reflexes assessed.

Palpation:

The next step is to palpate the knee. Four specific features are assessed, two with the knee straight and two with the knee flexed to 90

degrees. The posterior surface of the patella can be palpated partially when the knee is extended. The patient is asked to relax the quadriceps completely and this loosens the patella within its femoral groove and permits the examining finger to palpate approximately one-quarter of the posterior surface medially and again laterally. The next step is to trap the patella with the hand placed firmly over the superior pole, and then ask the patient to straighten the knee. This "patellar restraint" test produces a posteriorly directed vector of force, and acute pain is felt if a painful patellar condition is present. The other knee should be assessed in a similar manner since the discomfort produced by this test is often felt bilaterally.

A second palpation test with the knee straight is the quantification of fluid in the joint. Using the medial hollow of the knee, evident in most people at the level of the patella, the presence or absence of a fluid shift into this site can be checked. Major effusions will of course fill this space so completely that no hollowing is present and a patellar tap can be elicited. A moderate effusion will fill the medial hollow of its own accord after the examining hand has swept fluid upwards into the patellar pouch. In a minor effusion the trace of fluid present will not fill the hollow unless, after sweeping fluid upwards, the examining hand then empties the suprapatellar pouch. This shift of fluid is best achieved by sweeping the hand round the lateral side of the patella to the suprapatellar pouch. The hand should not be taken further round the knee over the area of the medial hollow since this will obscure the events at that site.

The knee is now bent to 90 degrees and in this position the joint lines can be palpated relatively easily. They lie at right angles to the plane of the shin, and can be located at the level of the lower pole of the patella. Careful fingertip pressure over discrete portions of the joint line permits a precise evaluation of the sites of tenderness. Joint line tenderness is of course synonymous with meniscal pathology unless proved otherwise, but there is a "no man's land" medially where the tibial collateral ligament crosses the joint line. This should be appreciated and palpation is then directed to assessing the points of attachment of the two collateral ligaments. Medially, the regions of the adductor tubercle proximally and the tibial flare distally should be felt. Laterally the fibular collateral ligament is more posteriorly placed and of course inserts into the head of the fibula. Other sites of capsular tenderness should be sought in this second stage of palpation when the constraining structures of the knee are being assessed.

Fig. 2. This view looks into the concavity of a medial meniscus. A horizontal cleavage lesion can be seen in the central portion of the meniscus, with a resultant "fish-mouth" abnormality.

Movement:

The final stage in examining the knee consists of moving the joint. Extension should be measured with the patient lying prone. This ensures that the back of the knee is examined, but equally important is the fact that it affords a fairly accurate assessment of minimal losses of extension. The patient is asked to hang the legs over the edge of the examining couch, with the knee joints at the edge of the couch. Any slight elevation of the heel on the affected side indicates a loss of full extension, and the eye is far better equipped in assessing a distance of this sort than minor alterations of angle. In the same way, full flexion is measured, with the patient lying prone or supine, by measuring in finger breadths the heel to buttock distance on either side.

During flexion and extension abnormalities of patellar mechanics can be roughly assessed by watching how the patella "tracks" in the femoral groove. Pain and crepitus during movement should also be recorded. Discomfort, and particularly a clunking sensation produced by rotating the tibia internally and externally when the knee is in flexion, suggests an internal derangement is present, although the test is by no means specific for a torn meniscus.

Coronal laxity implicates the collateral ligament, but stressing the knee in varus and valgus should always be conducted with the knee flexed to approximately 20 degrees, as well as fully extended. In this way, the screw-home action of the tibia and femur in full extension can be obviated. Rupture of single ligaments rarely occurs without associated soft tissue injuries, and thus tears of the tibial collateral ligament may be accompanied by rupture of its deeper lamina and synovium medially, by rents in the postero-medial capsule, and by damage to the anterior cruciate ligament or medial meniscus. It is important to realise that ligament rupture rarely occurs in isolation; for this reason, testing for, and repairing ligament disruptions is complex.

It should be remembered that ligaments are not simply passive restrainers of abnormal movement, but also carry nerve fibres concerned with proprioception and pain. Complete ruptures may therefore be relatively painless, the joint hinging open without discomfort. A haemarthrosis will escape through tears in the capsule and synovium, so that in significant ligament injuries the knee is never tensely swollen. Testing for rotatory instability of the knee is beyond the scope of this article, but the symptoms of pain and instability are frequently so gross that demanding surgical procedures and rehabilitative programmes become necessary.

Laxity in the sagittal plane is classically taught as a differentiation between the posterior and anterior drawer signs. These two tests are conducted with the knee in 90 degrees of flexion, and prior to any attempt at eliciting abnormal movement, the contour of the knee should be reviewed from the lateral side. If there is tibial "dropback", there will be a concavity below the patella where the tibia has sagged posteriorly. This is indicative of a posterior cruciate rupture which may occur from sudden violence directed to the shin in a backward direction, such as the leg striking against the dashboard of a car; or this laxity may occur after a dislocation of the knee, where clearly other significant ligament disruption will have occurred. Having assessed the tibio-femoral relationship, the hamstrings should be checked for slackness and then the proximal tibia pulled forwards and pushed backwards. Movement of more than a few millimetres indicates abnormal instability and implicates the cruciate ligaments.

Unfortunately a positive anterior drawer sign is rarely indicative of an anterior cruciate ligament disruption on its own, and both the postero-medial and postero-lateral capsule must be presumed to have ruptured with subsequent healing in an elongated manner. Perhaps a more specific test of anterior cruciate damage is the so called Lachman test where the anterior drawer sign is looked for with the knee in 20 to 30 degrees of flexion.

Although anterior and posterior cruciate disruption may be present, repair of these ligaments is extremely complex and sometimes of dubious merit. It therefore becomes somewhat academic to elicit these tests, and many of the instabilities detailed can be adequately controlled by due attention to quadriceps and hamstring muscle strength.

RADIOGRAPHY:

The radiograph is of great importance, particularly in assessing the painful knee after trauma. Fractures of the femoral and tibial condyles, and osteochondral fractures of the patello-femoral joint should be excluded. A "skyline" view of the patella is essential where a patellar dislocation or laterally directed shearing force may have produced an injury to the articular surface of the patella or associated femoral groove. This view is taken with the knee flexed, aligning the x-ray beam tangentially to the anterior surface of the knee.

An occasional source of locking in the young patient is the presence of a loose body secondary to osteochondritis dissecans, or more rarely to a torn portion of a meniscus. The fabella, located in the biceps tendon, is commonly mistaken for a loose body. In addition to the standard lateral and antero-posterior views of the knee, a "tunnel" view is essential if loose bodies within the inter-

condylar region are to be discerned. This view is taken with the knee flexed to at least 90 degrees, and the x-ray beam is directed in the antero-posterior direction. The radiograph will also show up other radio-opaque features, such as chondro-calcinosis, calcification in ligaments and the very rare occurrence of a true foreign body.

ARTHROGRAPHY:

Arthograms are of great use, particularly in eliciting medial meniscus tears. Trained personnel are required and the technique is not without slight hazard. Nevertheless it is a useful adjunct in the examination of the painful knee, particularly where both horizontal or vertical tears of the medial meniscus are suspected. Error is more likely in interpreting pathological conditions of the lateral meniscus owing to the artefact produced by the closely associated popliteus tendon. The size of a popliteal cyst can also be assessed, and if double contrast medium is used the cruciate ligaments may be outlined.

ARTHROSCOPY:

Competence at arthroscopy is essential before much reliance can be placed on the use of the instrument clinically. Diagnosis of meniscal tears, chondromalacia patellae, ruptures of the cruciate ligament, and confirmation of loose bodies are all possible with considerable accuracy. The arthroscope visualises the lateral meniscus better than the medial, and in this sense complements the arthrogram which is more accurate in assessing the latter structure. The postero-medial corner of the knee is poorly seen if the arthroscope is introduced anteriorly, although in cases of ligamentous laxity a better view may be obtained. It is for this reason that smaller diameter arthroscopes, often introduced in the posterior corners of the knee, can elucidate pathology in the posterior portions of the knee.

Surgeons experienced in arthroscopy now carry out a number of procedures through the operating arthroscope, such as partial meniscectomy, synovial biopsy, removal of loose bodies, cartilage shaving and partial synovectomy. The "plica syndrome", due to a symptomatic and fibrotic synovial band rubbing over the medial femoral condyle, can also be satisfactorily treated through the arthroscope. This syndrome is characterised by pain and tenderness over the medial femoral condyle rather than the joint line, and with a clicking sensation during flexion and extension of the knee. The thickened plica can be felt with the examining finger and may be visible during knee flexion. Diagnosis of this condition should include both the presence of a fibrotic or oedematous medial parapatellar plica and an associated medial femoral condylar lesion from contact with the abnormal band. Excision of the band through the arthroscope is perfectly possible and often relieves symptoms. Plicae in the suprapatellar pouch in relation to the fat pad are not a source of pain.

SUMMARY:

Diagnosing the cause of knee pain is often a complex clinical exercise and requires a careful history and examination in every case. Additional tests of knee instability, and realisation that many sources of knee pain are not due to meniscus lesions alone, have made the advent of newer diagnostic techniques most welcome. Arthrography and arthroscopy can complement each other in this endeavour, and ensure a successful diagnostic rate in approximately 90% of cases treated in specialist units. Every case of persistent knee pain should be investigated fully since the presence of pathological conditions in the knee cause a progressive worsening of symptoms if they are not treated with accuracy in the early stages.

Fig. 3. A discoid lateral meniscus removed at arthrotomy. This may be a source of pain and instability in the juvenile knee.

More and more people in Scotland are carrying less and less cash.

Instead they're carrying a Bank of Scotland Cheque Book. Straightforward, smooth and stylish like the service behind it, it pays your way wherever you go.

Quietly and without fuss.

You keep your cool and your suit keeps its cut.

A bit more style than a wallet. A lot more practical, too.

You're first with Scotland's first bank.

BANK OF SCOTLAND

84b

THE FUTURE OF TRIMETHOPRIM

AW McKinlay, BSc (Hons)

from a dissertation read before the Society on 11th February, 1981

Co-trimoxazole became available for medical use towards the end of 1968 and represented a successful marriage of the old and the new, being a combination of a sulphonamide and a new drug called trimethoprim. Today it is one of the most widely prescribed drugs in the United Kingdom, and is used extensively in urinary and respiratory tract infections. More recently, however, trimethoprim has been released for use on its own, and this has raised considerable controversy as to which is the drug of choice.

Three original claims for co-trimoxazole

Simple laboratory tests suggest that a combination of trimethoprim and a sulphonamide will inhibit bacterial growth at concentrations lower than either drug on its own. More formal assays which compare the drugs over a range of concentrations confirm that the antibacterial effect of the combination greatly exceeds a purely additive response. The drugs' interaction is said to be synergistic, although no single definition of the term synergy has ever been universally accepted.

(1) The first claim made for co-trimoxazole was that this synergistic effect would prove benefician in the clinical situation[1].

Two major categories of antibacterial drug have been described. Bacterio-static drugs merely prevent the multiplication of a bacterial culture, but the organisms remain viable and will grow again if transferred to a fresh medium. Bactercidal drugs actually kill the bacteria, and the number of viable organisims in the culture declines.

(2) The second claim put forward for co-trimoxazole was that although trimethoprim and sulphamethoxazole are bacteriostatic on their own, their combination is bactericidal.

(3) Finally, it was believed that a combination of trimethoprim and sulphamethoxazole would prevent the emergence of trimethoprim-resistant bacteria.

Fundamental to this last claim was the work of Darrell, Garrod and Waterworth (1968)[2] which is still widely quoted. Large inocula of bacteria were exposed to increasing concentrations of trimethoprim, and resistant strains were shown to emerge. Resistance could not be induced so readily when organisms were exposed to a combination of trimethoprim and sulphamethoxazole.

Bacterial folate metabolism

Biochemical pathways involving the transfer of single carbon units utilise a co-factor to which the carbon moiety is temporarily attached. In the majority of cases the co-factor is tetrahydrofolic acid (THF). Important cellular processes that require THF include the synthesis of a number of amino-acids and the formation of purines which are amongst the basic building blocks of DNA and RNA. Of particular interest is the synthesis of thymidine from deoxyribose uridine monophosphate (dUMP). In this complex reaction THF not only acts as a methyl donor but also as a reducing agent, being oxidised to dihydrofolate (DHF) in the process. The cell reconverts DHF to THF via the enzyme dihydrofolate reductase (DHFR) which is crucial to the maintenance of the cellular pool of THF. Many of the reactions involving THF are broadly similar in both mammalian cells and in bacteria, but they differ greatly with respect to their source of new folate. Mammals absorb preformed, exogenous folate from dietary sources whilst most bacteria must synthesise it *de novo* from dihydropteridine and para-aminobenzoic acid (PABA) (Fig. 1). Often bacteria can absorb exogenous PABA but few can absorb folate itself.

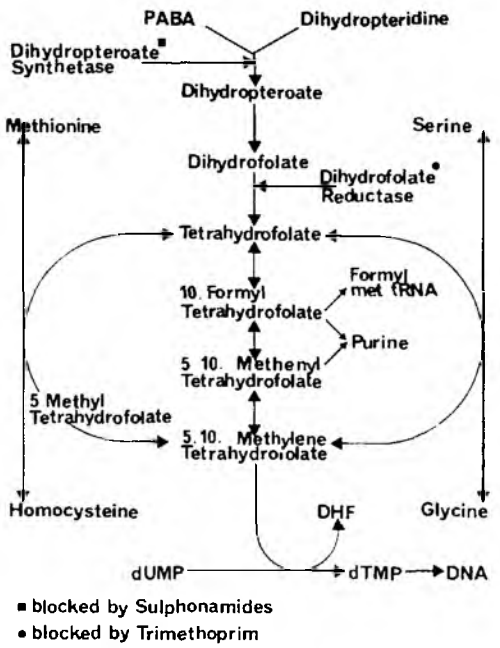


Fig. 1: The synthesis of folic acid and some important reactions using THF.

The metabolic actions of sulphonamides and trimethoprim

Woods (1941)[3] showed that the antibacterial properties of sulphonamides could be antagonised by PABA, and it is now accepted that sulphonamides act as PABA analogues and competitively inhibit the dihydropteroate synthetase (DHPS) (Fig. 1). Since mammalian cells do not possess this enzyme only bacteria become folate depleted. Moreover, since most bacteria cannot take up folate they are unable to bypass the blockade. After the Second World War research started on antimetabolites of folic acid itself resulting in a number of small molecular inhibitors, including trimethoprim, which exploit subtle differences between the DHFRs found in different species.

Sulphonamides and trimethoprim, therefore, sequentially blockade the synthesis of THF by the baterial cell, and this is the conventional explanation for their synergistic interaction.

This argument has come under increasing attack recently: firstly it assumes that the folate pathway is a linear one, when in fact it is not. The production of thymidine at the expense of THF and its subsequent reconversion to DHF introduces a cyclical series of reactions. Trimethoprim inhibits the crucial step and so halts the cycle. On purely theoretical grounds, therefore, it would seem that trimethoprim is probably the more important member of the partnership. Opponents of sequential blockade argue that the degree of inhibition is entirely dependent on the more effective of the two inhibitors, which is trimethoprim. An analogy can be drawn to a water-pipe on which there are a number of taps. The flow rate in the pipe is dictated by whichever tap is shut off the most. Other taps on the pipe make no difference to the overall flow rate. It has also been shown that some bacteria entirely resistant to sulphonamide show a classic synergistic effect when this is combined with trimethoprim. The DHPS in such strains is known to be insensitive to sulphonamide and it is extremely difficult to explain the syngeristic effect using a sequential blockade model.

Poe (1976)[4] has produced evidence which suggests that sulphonamides may bind not only to the DHPS but also to the bacterial DHFR. It is suggested that binding the sulphonamide somehow improves the activity of trimethoprim. In support of this are reports that sulphonamides will inhibit haematopoiesis in mouse bone marrow, which does not contain a DHPS. The effect is reversed by folate and it appears that the sulphonamide is inhibiting the DHFR.

Bacterial resistance to sulphonamides and trimethoprim

Chromosomal resistance to both trimethoprim and sulphonamides is known to occur. The DHPS or DHFR may gradually mutate to a form less sensitive to inhibition by the drugs. Alternatively, the cell may produce vast quantities of enzyme and in this way maintains a pool of active enzyme molecules. Some sulphonamide-resistant staphylococci overproduce PABA and so displace the sulphonamide from the DHPS. These chromosomal mechanisms rarely produce high level resistance. I suspect that these were the mechanisms that the experiments of Darrell, Garrod and Waterworth (1968)[2] selected (see page 1.).

Two chromosomal mechanisms confer total

resistance to the cell. The first is an impermeability mechanism and is usually found in species that are intrinsically resistant. Secondly, some bacterial strains have dispensed with the enzyme thymidine synthetase, and so avoid degrading their pools of THF. Growth is maintained by the absorption of exogenous thymidine. Despite their somewhat perilous life-style, thymidine-dependent mutants can be pathogenic in man and are sometimes isolated from urinary tract infections.

A second type of bacterial resistance is carried on "plasmids" – small circular pieces of DNA, distinct from the chromosome, that can replicate and maintain themselves stably over many generations. It has been known for many years that some plasmids can transfer themselves from one bacterial cell to another. It has been found more recently that some resistance genes can jump from one plasmid to another, a process known as "transposition".

Plasmid mediated resistance has been found to both sulphonamides and trimethoprim. Two mechanisms for sulphonamide resistance occur. Firstly, the production of a new DHPS insensitive to sulphonamide, and secondly an impermeability mechanism.

Only one major mechanism for trimethoprim resistance has been shown, and this involves the production of a highly insensitive DHFR. This enzyme is, unfortunately, highly specific for DHF, and will not bind trimethoprim or methotrexate (which resembles folic acid very closely). The prospects of designing a new inhibitor to block the enzyme are therefore remote.

In-vitro studies on co-trimoxazole

Recently the original claims for co-trimoxazole have been reassessed by a number of workers, and I am very grateful to Dr. S. Amyes (Department of Microbiology, University of Edinburgh) for allowing me to quote his recent work on this subject.

Fig. 2 shows a culture of *Escherichia coli* grown in a minimal medium, that is a medium containing glucose and some inorganic salts. Trimethoprim and sulphonamide are bacteriostatic and the growth of the culture is prevented. The original claim forecast that their combination should be bactericidal, but under these conditions the combination is only bacteriostatic. This tends to refute the second claim.

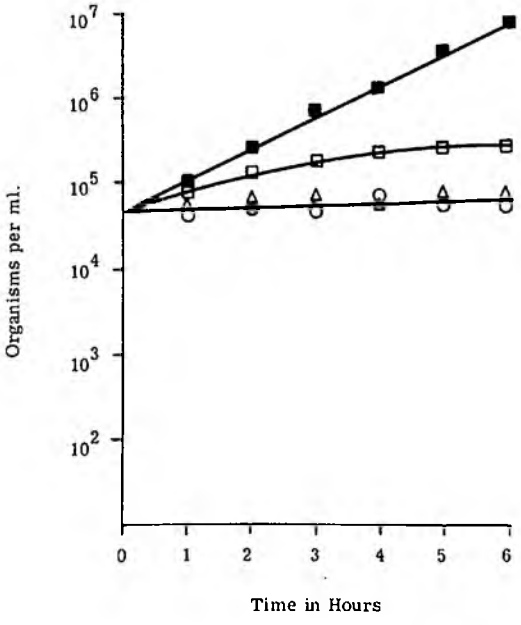


Fig. 2: Effect of trimethoprim and sulphamethoxazole on the viability of *E. coli* K_{12} in DM. An exponential culture was diluted into pre-warmed medium containing no additions ■ : trimethoprim (5 mgl^{-1}) △ ; sulphamethoxazole (100 mgl^{-1}) □ ; trimethoprim (5 mgl^{-1}) and sulphamethoxazole (100 mgl^{-1}) O.

Co-trimoxazole is widely used to treat respiratory and urinary tract infections. Conditions in the respiratory tract are difficult to model *in vitro* but specimens of urine are much easier to obtain and to analyse. Amyes and Smith (1974)[5] were able to show that conditions in the urine could be duplicated quite closely by a minimal medium with supplements of some amino acids. The addition of methionine, glycine and serine produces conditions that duplicate urine as far as trimethoprim and sulphamethoxazole action is concerned.

When the previous experiment is repeated using this medium it can be shown that 0.04 µg/ml trimethoprim has no effect on growth on its own, while 0.1 µg/ml is bacteriostatic (Fig. 3a) Above 0.1 µg/ml, however, trimethoprim becomes markedly bactericidal when used on its own. The concentration of trimethoprim achieved in the urine varies between 100-200

μg/ml. Sulphamethoxazole (Fig. 3b) never becomes bactericidal even at concentrations of 100 μg/ml.

In summary, therefore, under conditions similar to those found in the urine co-trimoxazole is bactericidal whereas sulphonamide is only bacteriostatic. At concentrations greater than 0.1 μg/ml trimethoprim becomes markedly bactericidal by itself. The second claim put forward for the combination is, therefore, not supported by this experiment.

Does synergy occur under conditions similar to those found in the urine? Fig. 4 shows the effect of trimethoprim and sulphamethoxazole combined in various ratios. 0.04 μg/ml trimethoprim on its own has no antibacterial action, but as the concentration of sulphonamide is increased the combination becomes increasingly active, reaching its maximum effect at a trimethoprim: sulphamethoxazole ratio of 1:20 that is 0.04 μg/ml of trimethoprim to 0.8 μg/ml sulphamethoxazole. Synergy, therefore, can occur under conditions similar to those found in the urinary tract. Unfortunately the concentration of trimethoprim

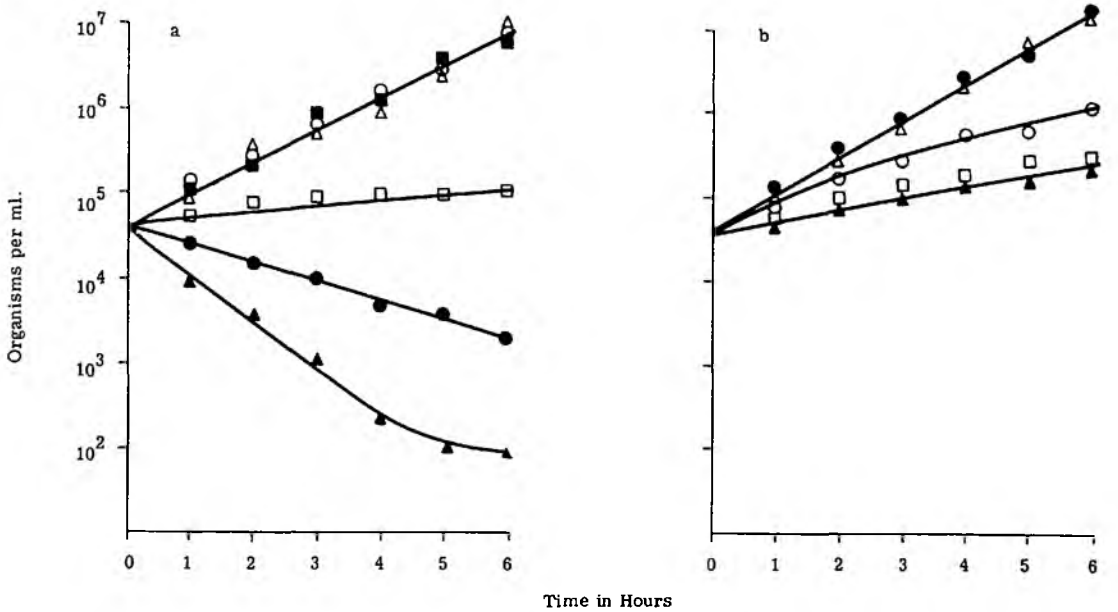


Fig. 3 a & b: Effect of trimethoprim and sulphamethoxazole on the viability of *E. coli* K_{12} in DM supplemented with methionine, glycine and adenine (50 mgl^{-1} each). An exponential culture was diluted into pre-warmed medium containing the following anti-microbial drugs. In (a) trimethoprim was used at 0 ■ ; 0.02 mgl^{-1} 0; 0.04 mgl^{-1} △ · 0.1 mgl^{-1} □; 0.2mgl^{-1} ●; 0.4 mgl^{-1} ▲; In (b)| sulphamethoxazole was used at 0 ●; 0.4 mgl^{-1} △ ; 0.8 mgl^{-1} 0; 2.0 mgl^{-1} □ ; 100 mgl^{-1} ▲ .

achieved in the urine is not 0.04 μg/ml but 100 μg/ml, at which it is markedly bactericidal on its own. Moreover, the trimethoprim: sulphamethoxazole ration is not 1:20 but 1:2 and there is no useful synergistic effect. Synergy would not appear, therefore, to be of any practical value in the urinary tract. Similar arguments apply to the respiratory tract. Indeed there are only two areas in the body where the drugs are present at the correct ratio for synergy, and they are the aqueous humour of the eye and synovial fluid. Synergy is unlikely to be of value except in these rather specialised areas.

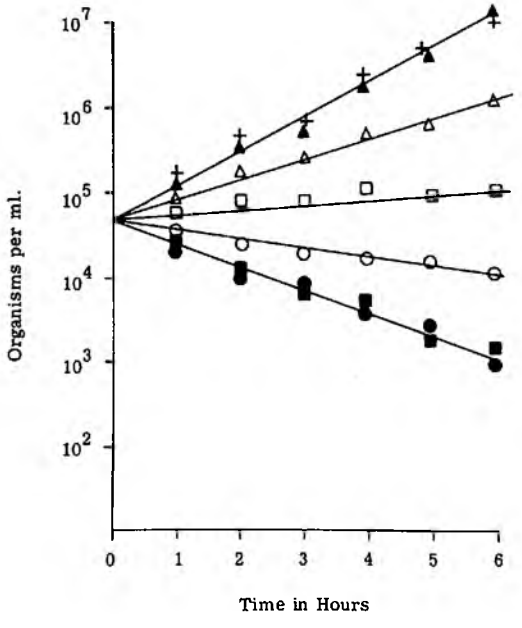


Fig. 4: Effect of trimethoprim and various concentrations of sulphamethoxazole on the viability of *E. coli* K_{12} in supplemented DM. An exponential culture was diluted into pre-warmed medium containing trimethoprim at 0.04 mgl^{-1} and sulphamethoxazole at 0 +, 0.04 mgl^{-1} ▲ 0.08 mgl^{-1} △ ; 0.2 mgl^{-1} □ ; 0.4 mgl^{-1} O; 0.8 mgl^{-1} ●; 4.0 mgl^{-1} ■ .

So far I have considered the action of the drugs on sensitive organisms. Figs. 5a and b show two strains carrying plasmids that confer resistance to sulphonamides. Plasmid SSu confers an impermeability type mechanism and no synergy occurs because the sulphonamiide cannot enter the cell. R1 codes for an insensitive DHPS, and yet synergy occurs with trimethoprim. This suggests that sulphonamide may also bind to the DHFR and in this way potentiates the action of trimethoprim. It is of no practical value, however, because the cell is sensitive to trimethoprim and would therefore be destroyed whether the sulphonamide was present or not.

Figs. 6a and b show two strains carrying plasmids that confer resistance to trimethoprim. R483 confers high level trimethoprim resistance, that is to concentrations > 1000 μg/ml. The addition of sulphonamide produces no demonstrable synergy.

R751 also confers high level (> 1000 μg/ml) resistance to trimethoprim, but in this case the addition of sulphonamide produces a striking enhancement of trimethoprim activity. The combination is markedly bactericidal and far better than either drug on its own. This is a remarkable result and represents an area where synergy would clearly be of advantage.

How do R483 and R751 differ? Studies on the enzymes produced by each plasmid show them to be similar, possibly even the same enzyme, when compared using simple biochemical criteria. The major difference appears to be the quantity of enzyme produced by each plasmid. A cell containing R483 produces more enzyme than R751, although quite how this renders it less susceptible to synergy is difficult to see.

Unfortunately this is of little clinical relevance because the majority of plasmid mediated resistance genes found in clinical isolates are of the R483 type and are therefore totally resistant to trimethoprim, irrespective of whether the sulphonamide is present or not. R751 resistance is very rare having been found once in London, and possibly once in Edinburgh. It is therefore of little concern clinically.

The claim that synergy occurs and is of value in the clinical situation is not supported by these experiments. Other *in vitro* studies have also pointed to the dominant role of trimethoprim.

Clinical findings on co-trimoxazole

The third claim made for co-trimoxazole was that it would delay the emergence of trimethoprim-

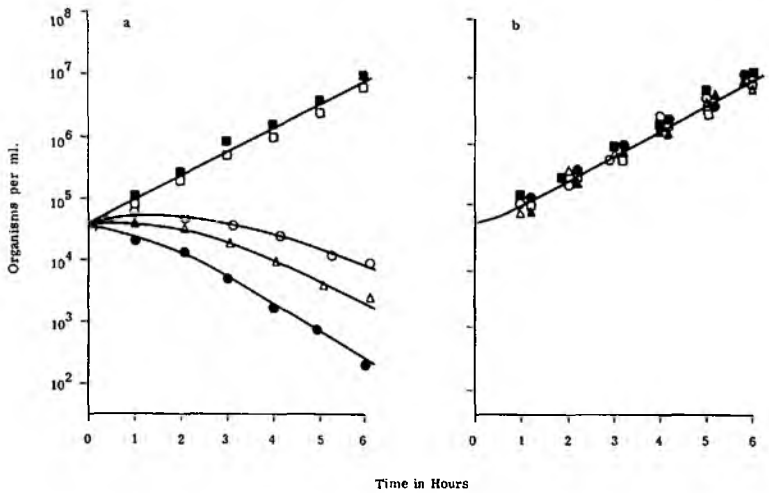


Fig. 5 a & b: Effect of trimethoprim and sulphamethoxazole together on the viability of *E. coli* K_{12} containing the sulphamethoxazole-resistant R-plasmids (a) R1 and (b) SSu. Exponential cultures were diluted into pre-warmed medium containing trimethoprim at 0.04 mgl^{-1} ■ or sulphamethoxazole at 100 mgl^{-1} □; and trimethoprim at 0.04 mgl^{-1} plus sulphamethoxazole at 0.8 mgl^{-1} O; 1.6 mgl^{-1} △ ; 3.2 mgl^{-1} ● 100 mgl^{-1} ▲ .

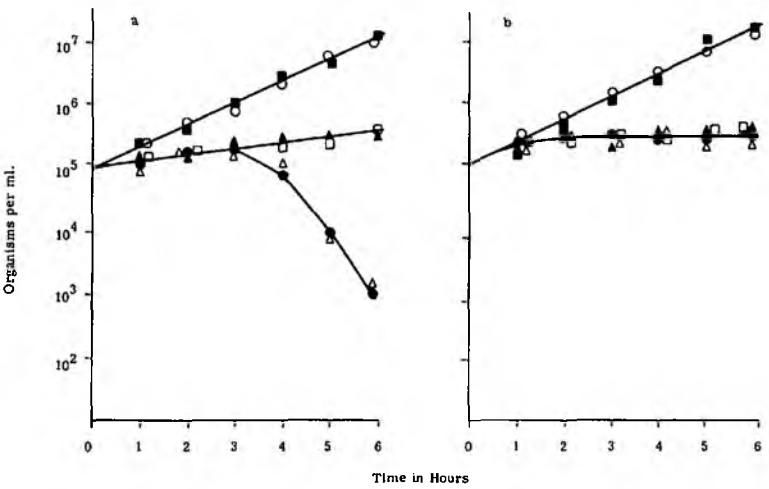


Fig. 6 a & b: Effect of trimethoprim sulphamethoxazole together on the viability of *E. coli* K_{12} containing the trimethoprim-resistance plasmids (a) R751 and (b) R483. Exponential cultures were diluted into pre-warmed medium containing trimethoprim at 5 mgl^{-1} ■ or 50 mgl^{-1} O; sulphamethoxazole at 100 mgl^{-1} ▲ or 1000 mgl^{-1} □ ; trimethoprim/sulphamethoxazole together at 5 mgl^{-1}/100 mgl^{-1} ● or 50 mgl^{-1}/1000 mgl^{-1} △ .

resistant bacteria. Sulphonamide resistance was common amongst bacteria even in 1968 when co-trimoxazole was introduced. It is difficult to put a precise figure on any resistance level because there is tremendous variation between surveys carried out in different areas. This probably reflects differences in the samples chosen for study; e.g. inpatients vs outpatients, the range of organisms encountered, local antibiotic usage patterns, and possibly laboratory test methods. Many studies suggest, however, that sulphonamide resistance is present in over 50% of all clinical bacteria, so many must have already been exposed to trimethoprim alone.

Resistance to trimethoprim was found very soon after its introduction, R-plasmids being isolated within one year of co-trimoxazole coming on to the market: few people suspected that R-plasmids would emerge this quickly.

It is difficult to estimate the current level of trimethoprim resistance. Work by Grüneberg (1980)[6] suggests that resistance amongst urinary tract pathogens has not increased dramatically since its introduction. Undoubtedly, more hospital acquired infections are resistant. Table 1 reviews a number of reports from European centres. French workers reported a high incidence of resistance (17%), whilst the incidence rose in Italy from 13% to 30% over a three-year period. Other continental reports show similar levels.

TABLE 1

Percentage of organisms with minimum inhibitory concentration of greater than 10 mgl^{-1} trimethoprim and those possessing trimethoprim R-plasmids (shown in parentheses).

	PAVIA	PARIS	LONDON	LONDON	NOTTINGHAM	TURKU
	ITALY	FRANCE		U K		FINLAND
1973	13(1.6)	17(0)				
1974	25(1.9)	17(6.6)				
1975	30(7.1)		8(0.8)			
1977			10(1.4)	11(2.7)		
1978					5(0.6)	22(0)
1979					3(1.0)	

Reports from the United Kingdom intially showed low levels of 2.5% and 4.3% but this increased from 8% to 10% in London over the period 1977-1978. Taken as a whole these figures suggest a gradual increase in resistance, which makes the figures from Nottingham (which show a decline), rather surprising. Closer examination shows that there was a small epidemic of resistant *Kelbsiella spp.* in 1978, which probably biases the result, but the level of resistance must still be relatively low. A recent study carried out in a number of Edinburgh hospitals suggests a much higher level of resistance (26%) than has been found before.

Turku is an area in Finland where trimethoprim has been used extensively on its own. A figure of 20% resistance amongst isolates is high, but is certainly in keeping with other areas where only the combination has been used, such as Edinburgh. The results of these surveys, although limited, suggest that resistance in an area where trimethoprim has been used alone is probably no higher than in many places where only cotrimoxazole has been used. A number of reports have found lower resistance levels. This may reflect sampling isolates from general practice or from hospitals serving different populations, or from areas where the use of co-trimoxazole has been

more limited.

If the percentage of resistance that is plasmid-mediated is examined, then a trend is revealed. Undoubtedly the percentage of plasmid-mediated trimethoprim resistance is increasing (even in Nottingham), and the range of plasmids is probably diversifying as the trimethoprim resistance genes transpose on to new plasmids.

In summary, therefore, resistance to trimethoprim varies from centre to centre. It is always higher in hospitals and in areas where trimethoprim has been used extensively, irrespective of whether it is combined with a sulphonamide or not. Plasmids carrying trimethoprim resistance are becoming increasingly common, and those carrying resistance to sulphonamides have been widespread for many years. I see no suggestion that the sulphonamide has in any way prevented the emergence of trimethoprim resistance and this would suggest that the third claim made for the combination is not vaild.

There are some similarities between trimethoprim resistance and ampicillin resistance. Ampicillin was released in 1960 and plasmids were found within one year. Initially most resistance was chromosomal but gradually the percentage due to R-plasmids increased (Richards and Datta 1981) [7] and the plasmid pool diversified as the TEM-β-lactamose transposed on to new plasmids. In the early 1970's, ampicillin resistance spread to *Haemophilus influenzae* and then to *Neisseria gonorrhoeae.* It worries me that trimethoprim resistance is also capable of transposition and I wonder if R-plasmid trimethoprim resistant *Haemophilus spp.* may emerge one day.

Conclusions

A hypothetical story relates that a group of aeronautical engineers once analysed the aerodynamic properties of the bumble-bee and "proved" that it couldn't fly. Co-trimoxazole to the bee; it doesn't work on paper but is "flies" in practice, and therefore why abandon a drug that obviously works well in the clinical setting?

I would suggest that the undoubted success of co-trimoxazole is due to trimethoprim, and to trimethoprim alone. Various clinical studies have shown no significant difference between co-trimoxazole and trimethoprim. Only one study, by Gleckman (1973) [8] has ever shown any significant advantage for the combination in the clinical situation. In this study over one third of the organisms cultured were from species of *Klebsiella, Enterobacter* and *Proteus,* which can be very variable in their resistances. No attempt was made to find the source of the bacteriuria, which could therefore reflect anything from pyelonephritis to a simple bladder infection. Courses of treatment were carried on for up to 55 days. Finally, although the level of sulphonamide resistance was assessed, no assessment of trimethoprim resistance was carried out. I do not think that this trial can be accepted in view of this omission.

There may be disadvantages to using co-trimoxazole. Sulphonamides are notorious for their side-effects, including Stevens-Johnson syndrome which is a severe form of erythema multiforme. It is rare but carries a high mortality. Wellcome have suggested that adverse reactions to co-trimoxazole are seldom severe: rashes occur in about 1.6-8% of patients and gastro-intestinal reactions such as nausea and vomiting are usually mild. Up to June 1976 five cases of fatal agranulocytosis due to Septrin had been reported to the Committee for the Safety of Medicines, which represents about one fatality in every 50 million treatment courses. Under-reporting of side-effects, particularly if mild, has always been a problem. For example, a surveillance study in the West Midlands was able to find 19 serious rashes, including three Stevens-Johnsons, one of which was fatal and one neutropoenia/thrombocytopoenia which was fatal. Co-trimoxazole is now the second most common cause of drug-induced thrombocytopoenia in the United Kingdom, seven cases being reported in the West Midlands, and four cases of agranulocytosis — one of which was fatal. Two further cases were not reported. This regional survey confirms that the national figures underestimate the incidence of major complications.

A clinical trial by Brumfitt and Pursell (1972) [9] found co-trimoxazole and trimethoprim to be comparable in antibacterial effect, but side-effects occurred in 21% of the co-trimoxazole group against only 8% in the trimethoprim group. When compared with ampicillin and cephalexin, trimethoprim was more effective and had less than half the incidence of side-effects.

In conclusion, therefore, there is little evidence that the three original claims made for co-trimoxazole can be substantiated. The presence of the sulphonamide probably contributes little to the anti-bacterial action of trimethoprim, certainly in the urinary tract, and can cause side-effects. It would be premature to comment on respiratory tract infections, but it would appear that neither the concentrations of the drugs or their concentration ratios are in the range where synergy would be likely to occur.

The future of trimethoprim is, therefore, bright in the short term, but resistance is an increasing problem, and plasmid mediated resistance in particular may prove troublesome in the longer term.

Trimethoprim is a cheap and effective antibacterial drug and should be used alone.

Acknowledgements:
I am very grateful to Dr. S.G.B. Amyes of the Department of Medical Microbiology, University of Edinburgh, for his thoughtful help and encouragement in preparing this article, and for allowing me to quote his recent work in this field.

REFERENCES

1. BUSHBY, S.R.M., & HITCHINGS, G.H: Trimethroprim, a Sulphonamide Potentiator: Br. J. Pharm. Chemotherap. 1968: 33, 72-90.
2. DARRELL, J.H., GARROD, L.P. & WATERWORTH, P.M: Trimethoprim: Laboratory and Clinical Studies. J. Clin. Path. 1968: 21. 202-209.
3. WOODS, D.D: The Relation of p-Aminobenzoic Acid to the Mechanism of the Action of Sulphonamide: Br. J. Exp. Path. 1940: 21, 74.
4. POE, M. Antibacterial Synergism: A Proposal for Chemotherapeutic Potentiation between Trimethoprim and Sulphamethoxazole: Science, 1976: 194, 533-535.
5. AMYES, S.G.B. & SMITH, J.T: Trimethoprim Action and its Analogy with Thymidine Starvation: Antimicrob. Agents Chemother, 1974: 5, 169-178.
6. GRUNEBERG, R.N: Antiobiotic Sensitivities of Urinary Pathogens: 1971-8: J. Clin. Path. 1980, 33, 853-856.
7. RICHARDS, H. & DATTA, N: Transposons and Trimethoprim Resistance: Br. Med. J. 1981: 282, 1118-1119.
8. GLECKMAN, R.A: A Co-operative Controlled Study of the use of Trimethoprim-Sulphamethoxazole in Chronic Urinary Tract Infections: J. Infect. Dis. 1973: 128 (Suppl.); 44-48.
9. BRUMFITT, W. & PURSELL, R: Double Blind Trial to Compare Ampicillin, Cephalexin, Co-Trimoxazole and Trimethoprim in Treatment of Urinary Infection: Br. Med. J. 1972: ii, 673-676.

Useful review articles can be found in:

LEADING ARTICLE, Bacterial Resistance to Trimethoprim, Br. Jed. J. 1980: i, 571-572.
Advances in Therapy with Antibacterial Folate Inhibitors: J. Antimicrob. Chemother. 1979: 5 (Suppl. B).

The text of the original dissertation, and comprehensive reference list, is available at the Society's Rooms.

RULE ONE, DROP ONE

by
Robert Buckman, BA, MRCP
Senior Medical Registrar, Royal Marsden Hospital

I suppose it is a universally applicable law of human behaviour that when anybody starts a new job they become, for a certain period of time, the New Boy. I suppose it is also an invariable rule that the New Boy feels awkward, foolish, clumsy and mawkish (no connection with the firm of solicitors of the same name). The only unique feature about the world of medicine is that the New Boy syndrome is that much more painful and embarrassing, and lasts a little bit longer, the average being between seven and fifteen years. The cause of the New Boy syndrome has been recognised for many years among ornithologists and behavioural animal psychologists, and it is all to do with the pecking order. To put it concisely, the animal that comes lowest in the pecking order, often called the 'runt' of the litter (particularly by the others), is pecked by everybody and doesn't get to peck anyone back. As a result, the runt becomes what we biologists call 'beaten up'. If after a long period of this established order, an even more significant animal is introduced to the system, this newcomer becomes the new runt, and the old runt, delighted to have somebody to kick around at last, relieves the many years of pent-up aggression by beating hell out of the new one. This system can be seen in operation among any assembly of gregarious vertebrates – for example, a duck pond, a chicken run, or the American Presidential Elections.

The world of medicine has many runts, some of them old, some new, some borrowed and many blue. The difference between the world of medicine and, say, the average chicken run (apart from the toilet arrangements, that is) is that in medicine the New Boy/Runt system is made worse by the acquisition of skills. An early mentor of mine put it beautifully. 'Most medical practice,' he said, 'is like riding a bicycle: once you can do it, you forget what it's like not to be able to.' He was a great physician, as a matter of fact, and was later awarded a Bensonian professorship by the Royal College for his long and devoted services to bicycle-riding.

Looking back on my own long and varied career in medicine, it often seems to me as if my early life consisted entirely of being the New Boy falling off a bicycle. There appear to have been so many times when I carried out some perfectly simple and straightforward procedure, only to get blasted out of my socks the next day by an irate registrar or consultant. (I speak of the time before I took my higher degrees and became an irate registrar myself.)

It seems to me that, as a junior houseman, I only ever broke one rule – the trouble is, it was always Rule One. For instance, one of the commonest duties a houseman is called on to perform is to relieve a man's distended and obstructed bladder by inserting a thin plastic tube called a catheter. This is a procedure that requires a little skill and a modicum of strength, and it usually engenders a great deal of relief on both sides when it works. The only problem is that there are about two hundred and ninety different kinds of catheter. Some have holes in the tip, others have holes in the side below the tip, others have angled ends, or balloons that can be inflated, some have bobbly bits at the end, others have three tubes running down the middle, others are dyed red, white and blue and play 'Rule Britannia' when they reach the bladder, while still others are motor-driven and come with heated rear-window and digital clock-radio. The point is that if they do the job they are meant to do, then they do the job they are meant to do and that is that.

So I would be called to the ward, I would look at the poor patient and then go and select one of the nine hundred bits of bent plastic in stock from the side-room, insert it into the patient's bladder, receive his thanks (and urine specimen) and go to bed. The next day on the ward-round I would cop

the entire wad from the registrar. 'Goddamit, Buckman, why the hell did you use a Beckstein-Toovey gauge 14 catheter? Don't you know Rule One of surgery — always, always, *always* use a Harris' 16 Silastic Double-Lumen Whistle Tip on the median lobe syndromes up to day three post.op.' I suppose it seems very obvious to you now that I mention it, but in those days everyone in the whole hospital seemed to have a different Rule One for me to break.

In theatre my first surgical consultant made a point of teaching me the basis of operative surgery. 'Rule One of safe surgery,' he would say, 'never, never, *never* put a toothed Parker-Carr arterial forceps across the bile duct without first checking for anomalous venous drainage of the pancreas.' And to this day, I never have. Particularly when taking out tonsils. Medicine was no less difficult than surgery. Consultants were always dashing up to me and saying things like 'Rule One of Neurology — always look for Lucknow's sign in any female who presents with tingling of the fingers, double vision, low back pain and ringworm.' The trouble is that consultants like that never told you what Lucknow's sign was, how to test for it or even what to do if it was positive. As a result, I have always said that Lucknow's sign was negative and so far nobody has ever bothered to check.

Obstetrics was no different. I think that the Rule One of Obstetrics was that every women over 35 who had had a previous baby weighing less than six pounds or more than ten, and who now had short sight, furred tongue and night starvation, should immediately be . . . . er . . . . well, I forget, should immediately be taken from here to a place of execution and there be hanged . . . . no that can't be right. Anyway, you get the idea.

I have come to regard the practice of medicine as a minefield of other people's Rule Ones — the harder you try not to tread on one Rule One the more likely you are to tread on another. But how does it happen: what causes us to forget our past ignorance so quickly in order to drop variegated poo from a great height on the New Boy? I think I can cast some light on the psychological processes underlying this phenomenon.

Suppose that you are a junior casualty officer called to see a patient with apparent tetanus (lock-jaw). You check him over as thoroughly as your sense of rising terror will allow, recalling that tetanus was a half-hour lecture in the middle of the Infectious Diseases course and that you were away on that Thursday at the dentist's. Having completed the clinical examination, you next go on to the second phase of standard casualty procedure — that is to say, you go berserk. You rush to the telephone and call up the duty medical registrar, the duty anaesthetist, the Intensive Care Unit, the regional health officer, the State Secretary for Health, the Minister of Defence, and most important of all, the local paper and the hospital head porter.

Then the medical registrar arrives and goes through the patient's pockets and finds an out-patient card for a local psychiatric clinic and a bottle of a certain kind of tranquiliser tablet. He turns to you with *that* smile on his face and says: 'Rule One of medicine, old boy, these tranquilisers can occasionally cause a disturbance of the jaw muscles that looks like lock-jaw but isn't. Never forget — if it looks like tetanus, it might be a phenothiazine dyskinesia.' Of course it might. You shrivel in shame and embarrassment. Your humiliation and degradation will keep your collar itchy and your underwear damp for the rest of your life and — like all nerve-shattering cataclysms — are completely forgotten in a fortnight. Yet you have acquired a sear: like a wound that is only visible when you are suntanned, it causes no difficulty in daily life. And so your newly acquired Rule One doesn't create any bother for you; in fact you don't even realise that it is a sensitive spot until 4.30 a.m. on your third night on duty as medical registrar, when some fool of a goddam casualty officer calls you out of bed to a straightforward phenothiazine dyskinesia muttering some damned nonsense about tetanus.

It is probably a very deep basic human characteristic to regard yesterday's acquisition as if it had been in the family for years. I suppose that in the early years of man's evolution it carried considerable survival value. Perhaps in the dim mists of time, in the Plasticene Era or something, there were two kinds of Neanderthal man. One learnt a new trick — say scratching his neck, or picking his nose, or making the tea — and when he woke up the next day said, 'I wonder if I can still do my new trick? Yes I can! How super! Etcetera.'

The other kind of Neanderthal man learnt the new trick, woke up the next morning and dashed around to the Patent Office. It was this second lot of course that later evolved into Cro-Magnon man and developed shorter tails, smaller jaw-bones and Harley Street consulting rooms. The older, self-congratulatory group, over the years, grew longer hair, developed tiny shrivelled-up brains and became actors. It is not yet known at which stage in man's development he learnt how to diagnose tetanus from phenothiazine dyskinesia: in fact reliable reports suggest that some members of mankind have still failed to learn it. Nevertheless, one thing is certain: they that know it have always known it, and have never not known it.

So there it is, a major component of our mental equipment — and one that I think we should guard against at all times because of the corrosive effect it has on those we seek to instruct. In fact would go so far as to say that there is only one Rule One, and that is that there is no Rule One. No, I take that back. I think there *is* a Rule One that encapsulates all that I have ever learned about the world. It is simply this: always be very cautious if you are following a car driven by a man wearing his hat. Rule Two is: doubly so if it's a cap. For some reason people who don't take their hats off when they drive are always the worst drivers in the world; they never signal, always swerve around the road and generally behave like prune-brained berks. They don't seem to know a damned thing about driving — they don't even know Rule One.

'Rule One, Drop One' is an excerpt from Dr. Buckman's book "Jogging from Memory" published by Heinemann/Quixote Press (£5.95);

●●

In Memoriam

DERRICK MELVILLE DUNLOP LLD, MD, FRCP, FRCPEd, DSc, FACP FRCSEd(Hon), FDS, RCS(Hon).

Sir Derrick Dunlop, Emeritus Professor of Therapeutics and Clinical Medicine at the University of Edinburgh and Honorary Fellow of the Royal College of Surgeons of Edinburgh died in Edinburgh on 19 June, 1980.

To say of a man that he became a legend in his lifetime is to risk censure for inappropriate journalistic hyperbole, but when applied to Sir Derrick Dunlop this cliché acquires the dignity of simple truth. In the eyes of a generation of Edinburgh medical graduates he was indeed a legendary figure whose unique qualities as a teacher and as a clinician entitle him to an honoured place among the great names in the history of the Edinburgh Medical School.

Derrick Melville Dunlop was born in Edinburgh on 3 April, 1902, the son of a distinguished physician, Dr. Harry Melville Dunlop — one of Edinburgh's earliest specialists in Child Health and one of the original physicians to the Royal Hospital for Sick Children.

Sir Derrick was educated at the Edinburgh Academy, Brasenose College (Oxford), and at Edinburgh University where he graduated MB ChB in 1925. In the following year he became a Member, and later a Fellow, of the Royal College of Physicians of Edinburgh. After holding resident appointments in the Royal Infirmary he went to London where he spent a short time in private practice but in 1929 he returned to Edinburgh to work for the man who was to have the strongest influence on his early career, Sir Robert Philip. His relationship with this world-famous physician and medical statesman was a very happy one, and it was as lecturer in the Departments of Tuberculosis and Therapeutics that his remarkable flair for teaching first became apparent. At the same time he was making a reputation for himself as a clinician and investigator which was recognised by his appointment in 1936 to the Christison Chair of Therapeutics and Clinical Medicine in Edinburgh University. This meant that he also became Consultant Physician to the Royal Infirmary where he assumed charge of medical wards at the unusually early age of 34.

His tenure of the Professorial Chair coincided with a period of spectacular advances in medical treatment and he was ideally equipped by intellect, temperament and training to meet the challenge of these exciting new developments. He attracted a group of able and dynamic clinical investigators to the Department of Therepeutics, many of whom went on to achieve high distinctions in academic medicine. With these devoted colleagues he made important scientific contributions in many fields — most notably in endocrinology, diabetes, nutrition and renal disease. The famous "Textbook of Medical Treatment" which he edited with Stanley Davidson and J.W. McNee, first appeared in 1939 and gained him an international reputation. It ran to nine editions under his editorship and was notable for its clarity and for its practical, commonsense approach to therapeutics. However, all these substantial achievements were overshadowed by his celebrity as a teacher. It is currently fashionable to denigrate the value of didactic teaching in Medicine and the formal lecture is widely held to be a particularly unsatisfactory method of instruction. No one who passed through Edinburgh Medical School in the Dunlop era would subscribe to this view. Sir Derrick's lectures illuminated and clarified their subject matter and any one of them was worth hours of solitary study in the library. He brought lecturing to the level of an art-form and the principles which he expounded were so spiced with sophisticated humour and no student ever willingly missed one of his lectures.

His eminence as a teacher was recognised in 1951 when he was appointed Sims Travelling Professor and his service as Chairman of the

British Pharmacopoeia Commission from 1954 to 1958 was one of many similar testimonies to his stature as a clinical scientist. In 1960 he was knighted and in the same year he was appointed Physician to Her Majesty The Queen in Scotland.

Retirement from the Chair of Therepeutics in 1962 found him still at the height of his powers — he was invited to assume responsibility for the inauguration of the new Committee on Safety of Drugs and in due course he became its first Chairman. It is no exaggeration to say that the firm establishment of this important regulatory body and its present smooth operation are largely a consequence of his leadership. His great qualities of statesmanship and diplomacy were never put to better use than in the early development of cordial relationships based on mutual trust between the Committee and the pharmaceutical industry.

As a student Sir Derrick had been an enthusiastic member of the Royal Medical Society and in 1925 he became a Junior President. Few things gave him greater pleasure in his retirement than the re-establishment of his links with the Society and he was deeply immersed in its affairs until shortly before his death. He became Chairman of the Society's Appeal Committee and in this rôle he played a notable part in all the events which led to resettlement in the Society in its new premises within the Student Centre. It was only natural that when the Royal Medical Society Trust was set up last year he should be invited to act as its Chairman, although by this time his health was failing.

The Royal College of Surgeons of Edinburgh conferred upon him its Honorary Fellowship and its Honorary Fellowship in Dental Surgery — a unique distinction that he prized greatly.

As he entered his eighth decade his intellectual powers remained undiminished as did his talent for oratory, and he was in constant demand as a speaker. Very few medical men have been such complete masters of the English language and in the ability to delight, to amuse or to inspire an audience he had no superiors within his profession.

His courtesy and charm were in keeping with his splendid appearance and his conversation remained sparkling and gracious even in the latter stages of his final illness. This, with all its physical tribulations, he bore most bravely and no one who saw him near the end will easily forget his contentment and serenity in the face of death. Much of this stemmed from the happiness of his family life which, in spite of all the activity of his brilliant career, was always of first importance to him. He is survived by his wife, his son and daughter. Behind him he has left countless memories of a great doctor who, in every aspect of his life, exhibited to the full that mysterious and indefinable quality which is called "style".

Iain F. MacLaren

BOOK REVIEWS

PRACTICAL STUDENT OBSTETRICS
Bende, S & Tindall, VR
Heinemann, 1980
pp; 435. £12.50

When the Editor of this journal gave me this book to meditate over an apology was contained on a slip of paper inside the front cover: "Sorry Chris, longer than I thought; please let me know if you can't find time". Twenty-four chapters and 419 pages later I am afraid I cannot but agree that for a book that sets out to provide a "concise and practical" text it is rather long. Quite why this book has been produced in a size that is a little too large for the pocket and a little too small for the desk is a puzzle to me.

Although the individual chapters are easy to read and full of useful information, it was my feeling that the title was not fitted as well as it might have been to the contents.

The illustrations are clear, profuse and the majority relevant to the text on the same or facing page — a point of design many books fall short on. However, some of the reproductions of ultrasound scan suffer from insufficient labelling, insufficient for an undergraduate such as myself at any rate.

The use of trade names for drugs is a controversial subject in medical circles. Of course, trade names cannot be avoided completely but the use of names such as Welldorm and Mogadon (p.193) in the text without reference to their respective non-proprietary names is surely not a wise principle to suggest to the undergraduate.

A new reflex I think I may describe is elicited by showing fellow students this book and then telling them the price — various patterns of language result but commonest of these is, after a momentary jaw-drop, "who on earth is going to buy it at that price". The book itself is packed with information but sadly at a cost of nearly a pound an ounce I think has priced itself above the "Student" of its title.

C. Ingamells

ESSENTIALS OF DERMATOLOGY
J.L. Burton,
Churchill Livingstone. 1980.
pp. 196. £3.95

Should Dr. Burton suddenly decide that Dermatology is no longer his raison d'être, I would have no hesitation in recommending he apply to "Punch" for a job. Dr. Burton has a witty turn of phrase that lifts a standard textbook from the mundane and functional into the eminently readable and, dare I say, enjoyable bracket. To suggest that "the forthright promulgation of unacceptable political views in totalitarian states" is a predisposing factor for the shedding of finger nails shows not so much an understanding of world politics as a true understanding and sympathy for the unfortunate medical student struggling through dry and often very tedious textbooks. "Essentials" is anything but that.

While the book does have its brighter side, the subject matter is presented in a logical, easy to follow and understandable way. After an introduction to the principles of diagnosis, chapters cover disorders of the main processes or building blocks of dermatology (keratinization, sweat glands, etc.). Infections and tumours are thoroughly emphasised as is the damage inflicted by radiation, ultra-violet light and the various little beasties who make their home on the stuff that keeps our innards from falling out. All the common diseases of the skin are covered very well as are a number of the less common ones. At the end of each chapter is a list of references for further reading and the whole thing is neatly brought together in a fine index, often the neglected part of a pocket textbook.

For me the chapter "The Skin and the Soma" on the dermatological manifestations of systemic diseases was the most fascinating and would be well worth extending, bringing as it does the art of observation back to medicine.

The only drawback of this book is unfortunately a major one. In the interests of economy there are no photographs, colour or black and white. A series of fine line drawings are included and the descriptions are good, but the reliance placed on using the eyes makes it essential that this book is used in conjunction with an atlas and plenty of practical experience for maximum benefit.

That aside, I could not fail to recommend this book to anyone who wants a pocket-sized book on dermatology or to anyone who wants to read a medical textbook which blows a refreshing wind across the barren dry stuffiness that seems the disturbing norm in all too many medical textbooks.

E. Crawford

ESSENTIAL PAEDIATRICS
Hull, D. & Johnston, D.I.
Churchill Livingstone, 1981
pp.305. £10.00

When looking at the bookshelves of my local shop

for an undergraduate textbook of paediatrics the choice lay between a large textbook (Hutchison's Paediatric Problems) and a note-form book (Lecture Notes in Paediatrics), there appearing to be a large gap between the two. It is into this gap that "Essential Paediatrics" falls both in size and in price.

On scanning through the book I was initially impressed by the shortness of the chapters, conducive to easy study in one sitting, and the clarity of the accompanying illustrations which complemented the text and succinctly reinforced the important points.

Further perusal at a more leisurely pace and as a constant pocket companion on the ward – for the book can fit inside a standard white coat pocket – showed the thoroughness of the authors as every disease encountered on the ward was mentioned in the book.

My criticisms of the book are minor. Firstly the index, although good, is not complete, and there is a lack of cross-references: one has to make associations oneself before looking the book up. My second criticism concerns the drawings which, although good, can hardly be described as "colour" when the only colour used is the occasional brown hatching.

In conclusion, I would recommend this book to any undergraduate who requires a basic yet comprehensive account of paediatric practice. The only problem I encountered trying to use the book for study was to find out which member of staff, from consultant to house officer, had borrowed it.

It is well worth the cover price.

Colin Holburn

PRACTICAL PROCEDURES IN CLINICAL MEDICINE
Michael J. Ford and John F. Munro
Churchill Livingstone 1980
pp. 128. £4.25

As medical science becomes more sophisticated and complex, so hospital doctors are called upon to carry out a diverse and ever broadening range of investigative procedures, many of which are potentially hazardous to the patient, unless carried out with care and precision. As one such doctor, I welcomed the opportunity to read this book, which gives guidance on 31 such procedures and contains notes not only on their execution but on indications, contra-indications and potential untoward effects. It covers procedures ranging from venepuncture to pericardial aspiration. It is written in concise terms and the drawings admirably complement the text. Whilst I was most interested to read all the chapters, I would consider that a few of the techniques described are not, and perhaps ought to be, within the repertoire of the senior medical students, house officers, and medical registrars for whose assistance this book has been designed. The procedures I have in mind are transvenous endocardial pacing, breast biopsy and renal biopsy. In my very short experience (most of it in a major teaching hospital) these procedures would be carried out only by those with the appropriate specialist training but perhaps more may be expected of generalists in other, less well staffed, hospitals. It could be argued that if the aforementioned specialist techniques are included in this book then others such as upper gastrointestinal endoscopy deserve mention. I am sure that its clarity and brevity will make this book a most popular choice amongst medical students and junior hospital doctors alike.

M.D. MacLeod

LECTURE NOTES ON CLINICAL ONCOLOGY:
Hancock, B.W. & Bradshaw, J.D.
Blackwell, 1981.
pp. 176. £5.50

In the present era of medicine, the speciality of clinical oncology has been born and is growing rapidly, establishing itself in an ever-increasing number of medical centres. At the same time, the diagnosis and treatment of cancer is still an important part of the work in most medical and surgical units, and general practitioners are all involved in cancer management at some stage. Therefore it was perhaps predictable that Blackwells would publish this further addition to their Lecture Notes Series sooner or later.

Hancock and Bradshaw have followed the traditions of the Lecture Notes Series by writing a comprehensive yet compact and easily read book. In order to achieve this they have made use of a variety of tables, graphs and diagrams which, in general, are useful *aide-memoires* for the student. Occasionally, however, the reader finds himself skipping from page to page as he tries to navigate his way through a particularly high density of illustrations. Nevertheless, each chapter is well organised, being subdivided by subject and paragraph headings which recur throughout the book, following a common pattern.

The initial five chapters give an overview of cancer, its investigation and staging, and the various forms of treatment. This provides an excellent introduction to and summary of the general principles of clinical oncology. The last two chapters discuss some of the wider aspects of management, and to what extent education, screening and prevention can play a part: again, well worth reading. The remainder of the book gathers together and updates information, which can be obtained in most large medical textbooks, into a concise account of presentations, diagnoses, managements and prognoses of the various malignancies which affect man. This section of the

book is bound to appeal to students and housemen alike, who are continually seeking small textbooks with the relevant information in as brief a form as possible. Hancock and Bradshaw state in the preface that their book is " . . . . . aimed at senior undergraduate students and recently qualified practitioners in all specialities: it is intended as an up-to-date guide to the theory and practice of all aspects of clinical oncology." By and large, they have succeeded in these aims.

G. Boyd

INTRODUCING ANATOMY
J.D. Lever
London: William Heinemann Medical Books Ltd. 1980.
pp. 288. £7.95

This book is intended primarily for premedical and predental students and preclinical students commencing their study of anatomy, in the belief that, by giving the student a simple perspective of human biology, he or she will have a greater return from the time available for studying anatomy.

The layout of the book is good overall. However, the chapter on epithelia and glands would, I feel, benefit from an earlier place in the book than the last chapter, and the respiratory and alimentary systems receive specific mention only in the introductory chapter.

The first chapter provides a sound introduction to the basic tissues and systems of the body but is greatly weakened by a lack of illustrations. There is a paucity of illustrations throughout the book: there are no colour illustrations, no radiographs, no photomicrographs and other deficiencies such as no illustrations of the upper respiratory tract. Many of the diagrams which the book does contain are poor and badly coordinated with the text. Since one of the anatomy student's main problems is fitting the detail learnt into an overall visualisation and it is disappointing that the book gives little help in this struggle. The best illustrations in the book (taken form "Surgical Anatomy" by Joseph Maclaise in 1851) are inexplicably hidden away in the chapter on the cardiovascular system, although they would complement the last chapter well.

Useful chapters on the animal cell and connective tissues are rightly placed early in the book. The later chapters, covering skeleton, muscle, nervous and cardiovascular systems, should also prove helpful to many students, but here more difficulty is encountered in describing general principles without the benefit of detailed knowledge. However, this book only seeks to introduce and it is up to the individual student to piece together the whole story, with the benefit of further study of anatomy and other subjects.

The book contains much useful information, albeit with some inaccuracies, but the text is not well written and there is a lack of organisation including a deficient index. It would be much improved by a careful revision and by more attention to simple regional anatomy in the later chapters.

Although, perhaps, it is a rather long introduction to anatomy it is well worth a read at the beginning of the course, but by the end of the preclinical course most students would find it of little value in revision as the information this book contains is found woven into the texts of the standard books. It is worth a scan during early visits to the medical library but, at the price, it is a companion volume which I feel does not merit a place on the average student's bookshelf.

J.S. Frater

●●

SOCIETY NEWS

MEMBERS OF COUNCIL FOR THE 245th SESSION 1981/82

The following members of Council were elected at the AEGM held on Wednesday, 20th May, 1981

Senior President	Brian Montgomery
1st Junior President	Alastair McKinlay
2nd Junior President	Hamish McRitchie
3rd Junior President	John Frater
Senior Secretary	Shona Ross
Junior Secretary	Aileen Van der Lee
Convenor of the Business Committee	Christopher Ingamells
Convenor of the Publicity Committee	Andrew Hoyle
Convenor of the House Committee	Roderick Elliott
Convenor of the Library Committee	Elizabeth Boyter
Convenor of the Museum Committee	Sandra Brown
Convenor of the Entertainments Committee	Dr Richard Elliott

NON–COUNCIL POSTS

Editor of Res Medica	John Frater
Convenor of the Annual Dinner Committee	Lyn McLarty
Chairman of the Medical Faculty Ball Committee	Shona Ross

Trust Fund Committee: Since the death of Sir Derrick Dunlop, the Committee has been under the Chairmanship of Prof. David Simpson. Dr. Jack Cormack is welcomed as the new Joint Treasurer – helping Mr. Iain MacLaren in this difficult task.

Travel Fund: This scheme – discontinued in 1974 – has restarted under the supervision of the Trustees. It is available to members of one or more years standing. This year £500 was divided between five applicants.

Library/Museum: Many of the old and valuable books have been rebound and are now in new book-cases. The museum has acquired some tape-slide equipment for members' use.

BIRTHS

To Dr Andrew Norton (Soc Ord) and Dr Beverley Norton (Olim Praeses, Trustee): a daugher, Zoe.

To Lord Perry (Fellow, Chancellor of the Open University) and Lady Perry (Dr Cathering Crawley (Soc Ord)): a daughter, Jennifer.

ENGAGEMENTS

Dr. Stuart Blackie (Soc Ord) to Miss Clair Moffett.
Mr. Ian Davies, BDS to Dr. Pamela Brown (Soc Ord).
Dr. Richard Elliott (Olim Praeses) to Miss Elizabeth Boyter (Librorum Custos).
Dr. Graeme Foubister (Soc Ord) to Dr. Susan Mutch (Soc Ord).
Mr. Peter Liston, BDS (Soc Ord) to Miss Carolyn King (Soc Ord).

MARRIAGES

Mr. Peter Claisse to Miss Zoe Trickett (Soc Ord).
Dr Ron Edwards (Soc Ord) to Dr. Rae Brown (Soc Ord).
Mr. John Frater (Soc Ord) to Miss Susan Chapman (Soc Ord).
Surg. Lieut. Simon Glover (Olim Praeses) to Miss Jane Petrie (Soc Ord).
Mr. Alex Hamilton (Praeses) to Miss Shona Ross (Aedile).
Mr. David Miller to Miss Lyn McLarty (Scriba).
Dr. Robin Mitchell (Olim Praeses) to Dr. Diana Robertson (Olim Praeses).
Dr. Michael Winter (Soc Ord) to Miss Margaret MacLean (Soc Ord).

THE SCOTTISH DEFENCE UNION

offers

TO GRADUATES OF SCOTTISH MEDICAL AND DENTAL SCHOOLS

- ***Professional Protection Throughout United Kingdom and Overseas (excluding USA and Canada)***
- ***Advice on Professional and Ethical Problems***

The Medical and Dental Defence Union of Scotland Limited

113 St Vincent Street
Glasgow G2 5EQ

Tel: 041-221 8381

Printed by PRINTAWAY LTD., Seton Works, Cockenzie, East Lothian.