Occasional articles

Crystal ball gazing and the effects of fate*

In 1981 Duncan Linsell, the then President of the Association of Clinical Pathologists, took as the title of his presidential address, "Clinical Pathologists—a threatened species".¹ In it he intimated that he had been persuaded to speak on this topic because of the decline in the number of young doctors in training, and particularly in the number of applicants for consultant appointments, and the emergence of a number of "threat factors" in our professional environment, coupled with the gloomy prognostications of his contemporaries.

Among the "threat factors" he discussed were the occurrence of management disputes in laboratories and the advent of trade unionism into the hospital environment which threatened consultant control of laboratories, the changing public attitudes to the profession resulting in an anti-authoritarian trend of challenge, and the financial decline of the country resulting in the exchange of the 10% annual increase to one of defensive rearguard action further complicating the pathologist's role. In looking at other factors for optimism, Dr Linsell came to the conclusion that in the future his successors would look back on his presidential address and say, "a threatened species, who said so?"

Since that address, the speed of change has accelerated enormously with the appointment of general managers at regional, district, and unit levels of the National Health Service (NHS), consequent on the implementation of the report by Griffiths,² who was invited by the Department of Health and Social Security (DHSS) to review the management of the health service. This has resulted in the drawing up of statistical guidelines by which the efficiency, or otherwise, of a laboratory can be judged. Functional and clinical budgeting has been introduced, with effects on the laboratory repertoire and its staffing levels, while complicating factors such as fast changing technology have added further unknowns to the composite practice of the laboratory of the future. In looking back to the "rosy-hue" days of my early medical career, and also forward to the undoubted changes and challenges which await the doctor in the laboratory, I am conscious of the enormous changes which continue to take place.

In the absence at that time of the availability of a formal qualification in pathology it was necessary to acquire "laboratory experience" after obtaining general medical experience. It was also usual to obtain a doctorate in medicine (MD) to show one's research experience. Having obtained general medical experience, fate took a hand when I heard that one of the lecturers in the department of pharmacology in the University of Liverpool had been granted two years' leave of absence to obtain what in those days was known as the BTA qualification (Been to America). I applied, was accepted as an assistant lecturer, and was promised that I would be able to complete an MD degree.

It was during this period that my interest in chemical pathology was stimulated, because I worked on the role of choline in the pathogenesis of myasthenia gravis. Having obtained the MD, I was determined to pursue further biochemical studies and arranged to spend two years in the University of Rochester's biochemistry department on a research fellowship to obtain an American Master of Science (MS) qualification. Again, fate took a hand in my future, when I was invited to accept an appointment as "lecturer in charge" of the department of pharmacology in Trinity College, Dublin. Anxious not to miss my trip to America, it was subsequently negotiated that I would spend one year before taking up the appointment in Dublin as a research pharmacologist with one of their graduates in the University of California at Los Angeles. Working long hours I completed all of the practical work for an MS degree in 10 months. It was on the pharmacological effects of various extracts of a liana known as *sciadotenia toxifera*, thus giving me further basic chemistry experience in methods of separation and identification and the subsequent award of the MS qualification.

I was within 10 days of leaving America when I received a telegram from Dublin requesting me to call in on the New York State Racing Laboratory to learn all that I could about the detection of drugs in the urine of racehorses. I was subsequently asked to set up a unit in Dublin to detect drugs in the urine and saliva of racehorses, and incidentally proving a source of revenue for the newly founded department.

During my time in Dublin, in addition to my pharmacological appointment, I became the official

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analyst to the Irish Turf Club—thus adding toxicology to my learning curve in chemical pathology.

My interest in hormones resulted in the establishment of a hormonal analytical service for patients of the Dublin Federated Hospitals. The College of Pathologists had by this time been born and because of my biochemical background and interests I applied for and was offered Founder Membership of the College.

I reflect on this history to emphasise how fate intervenes at important points of life and how our attitudes to consultant appointments in pathology have changed. May I venture to suggest that because of the more formalised training now available, a person with such a background today would be unlikely to be considered for a consultant appointment in this country, and yet I believe that I brought to chemical pathology, albeit in a restricted aspect of the subject, a different approach from that of many of my contemporaries who had gone through a more formal hospital, laboratory based apprentice-training.

This type of background has, I think, moulded my own views of the future of pathology and the pathologist. In these roots I can discern the fashioning of my own pragmatic approach to our discipline, and I would encourage all of our junior members occasionally to be unorthodox in the manner in which they gain their experience of pathology.

May I emphasise that I am not advocating a training in pathology which might not equip the aspiring consultant for independent practice. I freely express my concern over the possible effects of the proposed changes in the Royal College of Pathologists examination structure, which might have the effect of shortening the bench and interpretative training of the would-be pathologist.

As I now reach the point at which retirement looms on the horizon, it is opportune to speculate about the pathology of the future and about the pathologists who may or may not control it, and to speculate if fate will again take a hand. We face enormous technological and administrative changes, and this, combined with the ever increasing efforts to contain costs, will undoubtedly have profound effects on pathology and pathologists.

Technological changes

Technological changes will undoubtedly change the way in which pathologists currently practise. Testing near the patient has been developing for many years, initially because of the need to have instant results in intensive care and special care baby units, and subsequently elsewhere with the development of desk-top analysers and other simple-to-use instruments in all disciplines of pathology. Recent work has shown

that there is little difference in the results produced by such instruments, when they are operated in decentralised sites by nurses, secretarial staff, or junior doctors, compared with the results produced in the laboratory.³

It seems doubtful whether expensive laboratory day-time and on-call services will continue very long into the future for many common analyses, especially as machines are developed that allegedly need minimal technical expertise. Such developments are not only confined to the disciplines of chemical pathology and haematology; instruments based on biosensor techniques are already available for the rapid determination of bacteriological growth. These desk-top instruments are fast—they can be operated by instructed personnel to produce results in two minutes or less—and they have shown great uniformity in detecting several varieties of organisms.

In histopathology nuclear magnetic resonance and computer axial tomography are becoming so accurate that the need for examination of biopsy specimens by the consultant is likely to diminish rapidly. Microbiology and cytological histology will probably be the next disciplines to lend themselves to automation by reagent and instrument makers in the next decade, and it is possible to visualise desk-top automatic readers of cervical and other smears; in other disciplines the application of biosensors at the bed-side with the development of instruments to determine many medically important biochemical analyses will not be long delayed.

Whether at the bed-side or in the laboratory, the demands for non-invasive methods will increase. This is not only because people naturally tend to wish to limit their exposures to painful medical assaults of all sorts, but also because their lawyers will have less of an axe to grind if nothing enters the skin to cause iatrogenic injury. The inexorable rise into four figures of defence society subscriptions will add extra weight to this consideration.

The patterns of disease within our communities are also changing. In the United States of America the prevalence of acute illnesses has declined from 70% to 20% of all illness but chronic diseases have increased from 30% to 80%. It is in this group of patients that the development of self-testing programmes is likely to increase considerably, and where a consumer can start treatment without visiting a doctor, money and time can be saved by avoiding unnecessary clinic visits. The greater the use of self-testing programmes, coupled with the development of biosensors and automatic desk-top analysers, the less the need for a routine pathology laboratory and the subsequent need for the pathologist to look at the future of the specialty and to determine his or her place in that future.

All laboratories continue to be interested in

substituting labour for capital and are thus receptive to further automation. It seems likely that we are going to have to use a less skilled workforce for the mundane laboratory work and there may no longer be a need for the medium sized laboratory in all hospitals as the impact of new technologies, far removed from the laboratory, become evident. In non-urgent areas where results are not needed at once, it seems hardly a flight of fancy to imagine the development of a few "super" laboratories servicing several hospitals or districts with resultant economies of scale, even when expensive commercial "kit" type assays are used. It is essential, however, to have an efficient sample collection system, a suitable data network to feed the results back to the base hospital, and the willingness of pathologists to recognise that every hospital cannot offer an entire range of analyses and treatments for every disease. It seems inevitable that health service chiefs must seriously consider such moves, perhaps even by developing a private sector service for this type of assay. The recent appointment of management consultants by the Manpower Planning Advisory Group of the DHSS certainly points in that direction.

But hospitals are the second line of defence against illness. The first line is the general practitioner (GP) and events taking place there could again reduce the demands on hospital laboratories. It is interesting to speculate how the GP would cope with the advent of "instant pathology". From one drop of blood a device akin to a microchip could read out a veritable catalogue of biochemical and haematological values from haemoglobin, through a host of electrolytes, to more arcane variables such as serum zinc and folic acid concentrations.

The technology for this process is well established. It forms merely one side-shoot of that most prolific of human engineering—the silicon chip. Interestingly, the pharmaceutical company British Drug Houses (BDH) has already announced that it hopes to sell its latest clinical analysers directly to GPs despite the fact that NHS doctors have no means of obtaining reimbursement for the reagents used. This is in line with recommendations of the all-party United Kingdom Social Services Committee that GPs be encouraged to provide diagnostic tests on their own premises. Although the Government have currently rejected the idea, if implemented, it would have a profound effect: in some laboratories more than 30% of the workload comes directly from GPs—the effects of such a change would be enormous.

With the pressures to save money there will inevitably be a decline in inpatient admissions, coupled with a decreasing length of stay as performance indicators in the clinical spheres become more frequently used. Despite these pressures to diminish the amount of work of the hospital

laboratory it is evident that we might be on the threshold of a new technology based on recombinant deoxyribonucleic acid (DNA) research. These techniques are bringing the medical scientist much closer to an understanding of the pathogenesis of important diseases, such as cancer, autoimmune disease, and atherosclerosis, and may well result in an entirely new set of diagnostic procedures.

Administrative changes

The more important of the managerial changes now affecting pathology within a national framework are the result of the Griffiths report, for it is the discretion permitted in the DHSS document HC(84)13⁴ that has led to a diversity of management practices within pathology.

There are different types of staff working within laboratories, each with its own associated structure. Under the terms of the 1974 DHSS circular HSC(IS)16, a consultant is identified as the head of the department and is responsible for the proper functioning of that department. The only variation in this arrangement is the recognition that the head of the department could also be a "non-medical scientist" of equivalent standing. This was later defined by the Royal College of Pathologists as a top grade scientist of the Whitley Council Professional and Technical (A) Scientific grade. This was, I believe, a situation which should have been resisted forcibly at that time. It immediately suggested that the top-grade scientist could carry out all the functions (clinical, technological, and managerial) of the medically qualified consultant pathologist, and hence today we observe the claims of top grade scientists for equivalent pay for doing (what they allege is) the same job, while their professional organisations actively seek those conditions of service currently available to doctors within the NHS. Although their work may be complementary, I do not believe that consultant pathologists and top grade scientists do the same job, and perhaps the time is now opportune to define more accurately the functions of each.

The other main staffing structure in the laboratory is that of the medical laboratory scientific officer (MLSO). The terms and conditions of this group of laboratory workers are controlled by the Whitley Council 'B'. In the absence of any type of review body, the MLSOs have lost out considerably in financial terms during the past five years. The Whitley Council regulations for MLSOs prescribe a hierarchy of posts in departments from junior to senior chief MLSO. There is also the potential to appoint a higher grade MLSO, who will be graded as a principal chief if there are 63 or more MLSOs employed, or as senior chief if the laboratory has fewer than 63. This appointment is

not mandatory on the employing authority, which has discretion to refuse to appoint a "floating" MLSO, but if they do so, the Whitley Council agreement requires that he or she has "overall technical charge of the laboratory"—the definition of this phrase is less than clear. Dyson⁵ has pointed out that it does not refer to management control because the request for that title has so far been refused by the management side of the Whitley Council—yet it must imply some technical control over the work of the department.

It is the relationship between the medical and MLSO structure which has been responsible for many of the management difficulties that have arisen in NHS laboratories. This has been compounded by the appointment of Griffiths-type managers, as it is ultimately the health authorities' responsibility to produce an acceptable formula for an efficient and reliable pathology service.

The initiative of the Griffiths proposals to introduce management budgets for clinicians has now progressed to the stage of third generation pilot experiments. Inevitably, this could have enormous implications for the consultant laboratory manager. Budgetary management is becoming more complex and time consuming, and consultants must either allocate time to such matters, or inevitably the most senior MLSO or scientist will undertake this function with the loss of an important part of his or her management responsibility. The consultant who escapes this chore in this way or believes that he or she should devote the whole of his or her time to clinical work to the exclusion of management functions will be responsible for the more rapid demise of the medical pathologist in the NHS laboratory.

One of the problems which the consultant-manager of the laboratory will have to cope with is the growing pressure to change the current staffing structure. As indicated earlier, pressures for labour substitution will be great, for staff are the major financial burden of any laboratory. Highly skilled staff are often not required to operate automatic or semiautomatic machines, and there will be a need for unskilled and semiskilled assistants, working under the overall control of a few fully trained people.

With the present intention of devolving management to the peripheral unit, many solutions to the problems of the laboratory will probably become evident. That all of these will not be favourable to the position of the consultant pathologist is an inevitable consequence of this freedom to manage at a local level.

Of the other changes arising from the Griffiths management report, one of the logical implications of such reforms of the NHS is that doctors, both consultants and GPs, could eventually be placed on short term contracts with review before renewal to establish good quality of care and a continuing need

for the services of the doctor in each locality. Maynard has pointed out that this could be achieved either by a direct or indirect approach.⁶ The direct approach would necessitate a move to short term contracts—say, from 1 April 1990, offering zero pay increases to those retaining their existing contract and generous pay settlements to those who are prepared to move to short term contracts. Possible reactions to this might involve a trade union type of reaction from the British Medical Association. Entrepreneurs in the private insurance industry may also react with aggressive marketing of their policies if the threat of resignation from the NHS became a possibility.

The alternative to the "head on" approach is a Fabian gradualist approach—a policy that essentially uses consumer and competition policies to undermine the doctors' security of tenure over the next five years. By the end of this time short term contracts will appear increasingly attractive as a source of greater security of income and employment. Such an approach has, I believe, already been initiated by certain health authorities going out to tender for certain radiology and pathology services in hospitals.

Health authorities are already permitted to go out to tender for clinical services, and could, if they wished, buy in annually, say 500 hernias, 400 hips, 10 000 cervical smears and 200 bypasses from the lowest bidders, public or private. It is not beyond the bounds of possibility to imagine that entire health districts could be operated by the private sector. There is no doubt that this creation of an aura of uncertainty in the future would certainly add to the allure of a short term contract. Similar policies already operating in the United States of America are the result of the pressure to contain costs. Health care managers are producing practice "norms" and costs which are used as yard sticks to control clinical practice.

Breckenridge has pointed out that among the wonders of nature is the way in which many animals and birds are able to change their appearance or adjust their behaviour when the world around them changes and becomes threatening.⁷ The environment is unquestionably changing in pathology, and pathologists will have to adapt to survive these adverse conditions and developments which now surround us. New technology is changing the nature of the tests that laboratories undertake, while managerial limitations of finance demand accountability and the greatest possible return for the money spent. This leaves the traditional pathologist in a situation where, in addition to the changing nature of his or her work, the reason for existing is being seriously challenged by financially cheaper and managerially more easy to control scientific staff. The attraction of replacing the pathologist by this non-medical challenge must appear increasingly attractive to the new breed of general

managers.

The wind of change is blowing for pathology, and with respect to the staffing of laboratories three separate initiatives are currently taking place. There is the proposed amalgamation of the Whitley Council 'A' (graduate scientists) and Whitley Council 'B' (medical laboratory scientific officer grades) under the chairmanship of professor Roger Dyson. These seem to be making slow progress because of the entrenched positions of the participants in the talks—the professions themselves. These obvious stumbling blocks to progress are not apparent in the initiative of the Manpower Planning Advisory Group (MPAG) of the DHSS into a pathology laboratory staffing undertaken by an outside body—Management Advisory Services (MAS) of Cheltenham. The MPAG have used as a reason for the review the interest of the regional chairman and the publication of the National Audit Office Report on professional and technical manpower in December 1986. In this instance the various professional groups are only being used as a "sound-ing board" for the ideas promulgated by the Management Advisory Services (MAS) and gleaned by discussion with laboratory workers and visits to laboratories both in the public and private sector in England, and overseas in Germany and America.

In the interim, the Whitley Council responsible for MLSO terms and conditions of service have produced proposals which are remarkably similar to those being discussed and proposed by the other two groups. It would seem that the MAS has sought to establish the purpose of a pathology laboratory service, and to establish what effect pathology investigations have on the outcome of care for patients. It is of interest that in their preliminary overview of the current services they have indicated their belief that "pathologists are at a watershed" and that "defining the role of the pathologists is central to the definition of pathology services."

It is important to emphasise that advice on the appropriate investigation, the interpretation of the result, and the choices for care and treatment can only be effectively found in people with medical training, and who are registered with the General Medical Council. There is, however, a difficulty in the recognition by the Royal College of Pathologists that non-medically trained personnel may, on occasion, advise clinicians on the care and treatment of patients. I would strongly reiterate that some clear differentiation of membership and the tasks carried out should now be introduced between medical and non-medical members. This is not meant to denigrate the position of the non-medical scientist but the consultant and the scientist carry out different tasks, and this should be recognised.

In the future the staffing of NHS laboratories will

need to change to encompass changing technology. It is evident that a minimally trained group to undertake repetitive tasks is required, together with a smaller highly trained group of dedicated scientists, trained to undertake tasks requiring discretionary judgement, and controlled by the appropriate Board of the Council for Professions Supplementary to Medicine. Interestingly, the Whitley Council have recently indicated that the Fellowship of the Institute of Medical Laboratory Sciences should no longer be essential for promotion within the MLSO structure and that the Council for the Professions Supplementary to Medicine should in future control all of the educational requirements of non-medical staff in NHS laboratories.

Medical pathologists will assume the role of investigative physicians and, in addition to determining laboratory priorities, will become more clinically orientated. The smaller amalgamated technologist spine would be of degree standard, and could be afforded the opportunity to acquire the MRCPath diploma. The inevitable increase in non-medical membership of the Royal College could lead to uneasy relationships with other medical Royal Colleges. A transfer to a more clinically orientated Royal College has already been seriously suggested by groups of younger haematologists who see their future as more clinically than laboratory based.

Medical pathologists are currently in difficulties with their technical and clinical skills being deprecated, their future uncertain, yet having to deal with laboratory management and budgeting at a time of economic stringency if the MA's report is accepted. The most likely development for the medically trained pathologist is an appointment as "director of pathology", accountable to an appropriate general manager, and responsible for setting the direction of the service, ensuring its cost effectiveness, and managing the pre- and post-analytical phases. In this scheme a laboratory manager might also be appointed who, although responsible to the director, would manage the analytical phase. It is the relationship between these two which is important, particularly if HSC(IS)16 is abandoned. The position of the consultants in charge of each discipline would be particularly vague, for their technology staffs are likely to be the responsibility of the laboratory manager. This desire for change is obviously being pressed by the technical staffs of laboratories. This desire is not apparent either among medical pathologists or, more importantly, among the users (clinicians) of the service.

Despite the limitation of monies for laboratory expansion, in a wider context we observe around us the burgeoning array of administrators who currently inhabit the NHS, with their demands for more and more data of every possible type. This takes the

professionals time and effort to collect and there is little evidence so far that great use is being made of it. Knott has observed that, "in the corridors of our hospitals today you are just as likely to bump into an administrator as you are to a doctor or nurse. What is more the full-time administrator may be a doctor or nurse—a fully fledged clinically competent individual pushed from the prime of his or her bedside career, and thrown into the nightmare jungle of buff envelopes and A4 circulars".⁸ Not content with invading the hospital service, management seeks to convert some of our best medical personnel to its cause. This is not meant to be an attack on administrators; most of them are personable, hard-working individuals concerned that they are doing their job conscientiously—as indeed they may be. It is not the personnel that are at fault, it is the system. Whereas the pathologists of old had to be concerned about the accuracy and interpretation of the clinical report emanating from their laboratories and the clinical well-being of the patient, today they are expected to contribute to operational and strategic plans, provide information on staffing, test numbers and their complexity, budget, and balance the laboratory account, and attend numerous committees and give opinions on multifarious consultation documents—all tasks that inevitably increase the numbers of supporting administrative staff.

The fact that a district can make a logical case for appointing a director of planning and information when it is crying out for a pathologist to deal with the ever increasing backlog of cervical smears illustrates a lack of priority in forward planning. Even throwing money at the existing state of affairs simply exaggerates the disparity between those whose main task is clinical and those who support this activity in a myriad of disguises.

The Future

I believe that medical pathology and medical pathologists are now threatened as never before by the changes taking place around them, changes which are difficult to influence. Duncan Linsell's concluding remarks indicated that, in the future his successors would look back on his presidential address and say, "a threatened species, who said so?". Seven years on and there is little evidence that he was correct for all the signs about us indicate that unless we can delineate a new and changing role for the medical pathologist, the future is fraught with danger.

What is this new role to be? May I seriously suggest to you that we should leave the sheltered confines of our laboratories and venture forth to undertake those investigatory clinical tasks on patients which the new technology will demand—a reversion to the older functions of the "clinical pathologist". This has been

well shown by the radiologists whose clinical investigative function has increased considerably over the past 10 years.

The haematologists have grasped their clinical opportunities rather earlier than the other pathological specialties and perhaps even to the extent where laboratory training is now being sacrificed to clinical practice—this is to be regretted.

Histopathologists should be undertaking the colonoscopies and localising tumours or secondary deposits by the use of tumour markers, even taking into their repertoire nuclear magnetic resonance and other techniques developed to make a diagnosis at the patient's bedside. The future of histopathology for the medical pathologist will not be in the traditional histopathological diagnosis based on morphological criteria. It will be based on the comparable morphology expressed by different markers indicating differences in biological behaviour, metastatic potential, and prognosis. The early stages of this are already seen by the reclassification of some tumour types by suggesting functional differences between tumours currently having a similar histological appearance.

Chemical pathologists will have to emphasise their clinical roles and will have to ensure that they are the ones who control and use the biosensors and such developments at the bedside. More and more they will have to apply their knowledge to clinically specialised areas of their discipline. Fortunately, there is evidence that this is now occurring with the assumption of full clinical responsibility for the investigation of infertility and the treatment of outpatients with lipid, endocrine, and metabolic disorder, diabetes mellitus and nutritional problems. Flynn has estimated that 40% of the 194 NHS and honorary consultant chemical pathologists in England and Wales have such clinical commitments and 13% have charge of inpatients.⁹

Microbiologists are also witnessing a considerable expansion of their clinical role into the wards and kitchens of our hospitals and by the control of the spread of plagues such as the HIV virus and hepatitis and the determination of levels of immunity and susceptibility to disease within the community. We must seize the initiative by recognising the changes in our discipline, the lack of finance, probable privatisation and the development of new instrumentation and data processing methods. Petty strife among consultants must be minimal in recognising that we might lose some of our independence in the appointment of laboratory directors with the financial ability to make changes to influence the way in which the pathology service develops.

The forces in medical care are changing rapidly. Unless we as pathologists stay abreast of these changes we will be replaced by others who are waiting anxiously to take our place in laboratory medicine. It is

vitaly important that the clinical director of the laboratory should have the clear management authority implied within the Griffiths report and spelled out in HSC(IS)16. These issues are not bargainable.¹⁰ Let us also seek to enlarge our spheres of influence. As Breckenridge, the then president of the American College of Pathologists has said, "Let us embark on a new venture in an area of medicine that belongs to clinical pathologists".¹¹

Let fate again take a hand as it has with my own personal career. Who knows what the crystal ball will foretell for the new breed of clinical pathologist? Perhaps Sydney Dyke, the father of this Association, will yet see the development of the new clinical pathologist, and will permit himself to say, "and about time too!"

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